

# Essential Skills for the Gaming Industry

## Casino Math



# Casino Math Skills

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Participant Manual: Edition 1.0

Casino Math Skills: Essential Skills for the Gaming Industry

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# Essential Skills for the Gaming Industry

## Casino Math



# How to Use This Manual

The workbook is organized into two separate parts to be as flexible and user-friendly as possible for you and your learners:

1. Foundations
2. Job Families

## 1. Foundations

This is a review of the general, underlying Math skills required by most Gaming occupations. Foundations is organized by topics. Topics include, for example:

- Working with Fractions
- Counting Cash
- Converting Currency
- Estimating

Each Foundation section is organized as follows:

*Title:* Eg. Cash

*Teaching Tips:*

- Provides tips to help you conduct training on or tutor learners on the skills in the section. Included in many, but not all, of the Foundations sections.

*Introduction*

- Lists the skills to be covered in this section and the job families that most commonly use these skills.

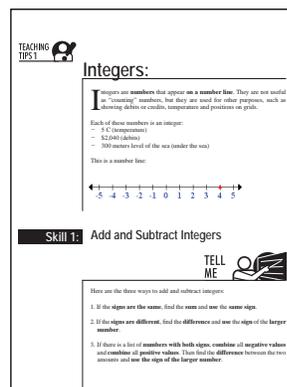
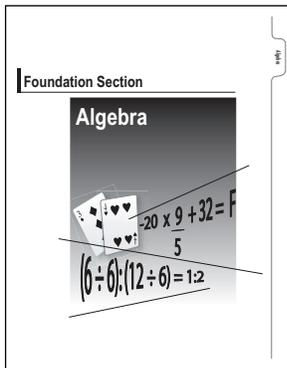
*Skill 1:* Eg. Calculating Tips

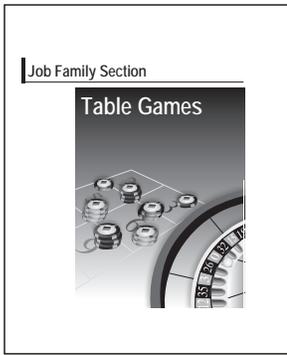
- *Tell Me:* Describes the skill, and how to use it.
- *Show Me:* Shows how to use the skill, using examples.
- *Let Me Try:* Provides exercises for the learner to practice the skills.

*Skill 2:* Etc.

*Check My Answers:*

- Provides answers for all the Let Me Trys.





## 2. Job Families

The Job Family sections contain practice questions organized according to specific Gaming/Casino job families. For example, learners who need to develop skills for “calculating odds and payouts” specific to Table Games will find relevant Math skills problems in the “Casino Table Games” section. Assign the job family sections according to the learner’s type of job.

If a learner has trouble performing the tasks in their Job Family section, they may need to review the Math skills for that task found in the Foundations section.

Each Job Family section is organized as follows:

*Title:* Eg. Table Games

*Introduction:*

- Describes the tasks covered and when they are commonly used.

*Task 1:* Eg. Calculate Bets, Odds and Payout

- Provides exercises for the learner to practice the skills needed for completing this task.
- These exercises are organized into levels of difficulty from Level 1 (easiest) to Level 3 (hardest). In many cases, Level 3 activities will mostly apply to supervisors, but not always.

*Task 2, 3, 4:* Etc.

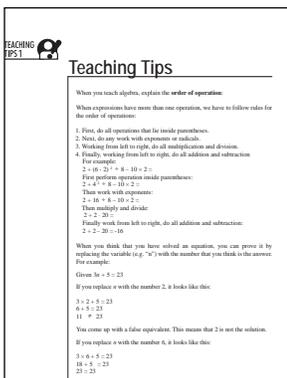
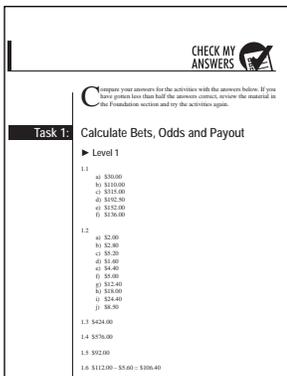
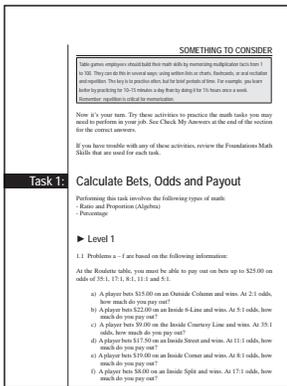
*Check My Answers:*

- Provides answers for all the exercises in the section.

### Special Features for Facilitators

The Foundation sections in this manual include two special features to help you work with your learners.

1. **Something to Consider**—These notes appear throughout the manual. The Something to Consider feature presents suggestions for applying concepts in the workplace. These notes also provide additional ideas that can help you and learners think about the concepts from different perspectives.
2. **Teaching Tips**—These tips are found at the beginning of most Foundations sections. Teaching Tips suggest techniques for teaching the material and additional information to help you understand concepts you may be unfamiliar with. If you are a new facilitator or new to teaching Math, you may find these tips especially useful.



# Facilitator's Guide

## Planning Your Training

Having a plan before you begin any type of training is key to a successful training event, whether that event is in a classroom with a trainer, one-on-one on-the-job training or a self-study assignment trainees do on their own. Your plan should answer questions such as:

1. Who are your learners, what do they need to learn and what do they need to be able to do on the job as a result of the training?
2. What will your training be about?
3. What, if anything, should learners know or have the ability to do in order to participate successfully in the training?
4. How will you deliver the training (e.g. in a classroom to a group, one on one, etc.)?
5. What strategies and activities will you use to deliver the training?
6. How long will each part of the training take and in what order should these parts occur?
7. What materials will you need to deliver the training?
8. When and where will the training happen?
9. How will you know if the training “worked”?

If you don't already have a training plan format that you use or if you are new to planning training, try the Training Plan Worksheet at the end of this section. The worksheet will help you work through the questions above to get you started. Following this worksheet, you will find a Training Plan Template that you can use to create the actual training plan you can use during your training session.

### ► Training Strategies

Below are a few strategies that will help you help your learners. Most of these strategies can be used both with groups of learners and individual learners.

1. Some sections are more complex than others. For complex sections, consider incorporating time for discussion and brainstorming with your learners. You may also find that some of the more procedure-based skills can be covered more quickly.

2. Allowing learners to pursue faulty reasoning or an incorrect interpretation of a question is a useful way to help learners develop problem-solving skills. Wrong answers offer excellent opportunities for self-analysis. However, this strategy can be time-consuming and frustrating for less confident learners. If you do use this strategy, be sure that you discuss where and why the mistake or weaknesses occur and how improvements can be made.
3. Adult learners are motivated to learn things that will help them understand and do things in the real world better. Allow time for learners to discuss how the topics relate to the real world and jobs specifically. Ask questions about similar experiences they have had, how they use the skills on the job already, how their new learning could be used on the job and/or help them do their job better, and what examples and strategies they can share with the group.
4. Independent learners will pace themselves. If you are working with a small group of learners or with individual learners, it may be helpful to set some goals related to how much work they can do, what is a reasonable timeframe for completing their training and strategies for helping them to be successful.
5. People need to use new concepts and skills as soon and as often as possible to actually retain what they have learned and to transfer their learning to the workplace. Encourage learners to plan short but frequent reviews of the material. Most importantly, have learners set specific goals and timeframes for using the skills on the job.

### ► Improving Your Skills

If you are new to training or job coaching or are interested in improving your training and facilitation skills, take a look at the three Ontario Lottery and Gaming Corporation quick reference tools at the end of this section:

- Trainer Skills Quick Reference
- Facilitation Skills Quick Reference
- Buddy Trainer Quick Reference

Use these tools if you are looking for pointers, ideas and reminders that will help you strengthen your skills as a trainer in the classroom and on the job.

## ► Using Other Resources

Use real-life workplace situations as teaching and learning opportunities as much as possible. For example, try incorporating authentic work place materials like forms, policies, and other practices used in the learners' workplace. You might also ask learners to come prepared with examples and questions from their jobs. Learning is richer and more meaningful when learners can apply the material to their workplace tasks.

## ► Estimating Time

The time required to cover the different sections will vary among learners based on their background, general knowledge and skills, and learning styles. When planning your training sessions, whether with individual or groups of learners, determine your learners' needs first. Then, you can plan for an appropriate amount of time for reviewing and practicing the skills they are working on.

Learners with a solid grasp of concepts may be able to work through problems with minimal guidance and more quickly than learners who are new to the concepts or have little job experience. Be sure to allow learners the time they need to master and transfer the skills to their jobs confidently.

You may find the following time estimates helpful when scheduling your training sessions. The actual time required, however, will vary depending on your learners' skills and the learning situation.

### Algebra

Time Estimate: 2 hours

- Assumes a firm grasp of earlier concepts
- Requires learners be able to think in abstract terms
- Not a very big component of this workbook

### Counting Cash

Time Estimate: 4 hours

- Required in many of the jobs and for many applications such as taxes, discounts, retail, food service and casino revenue
- Duties of any specific worker are clearly delineated
- Cash controls and procedures must be strictly observed
- A familiar concept for most people

### Decimals

Time Estimate: 1 hour

- Critical background knowledge for money math and measurement systems
- Many opportunities will arise for practice and application within different contexts

## Estimation Strategies

Time Estimate: 30 minutes

- Essential skill for success in real-life math
- Should be incorporated into all lessons/activities

## Fractions

Time Estimate: 2 hours

- Often a difficult concept for learners
- Can be a part of discussions of percentages and ratio/proportion

## Geometry

Time Estimate: 2 hours

- Geometry skills are useful for a range of purposes, but not to all of the jobs within the Gaming industry
- Excellent concepts for developing reasoning skills
- Provides opportunities for building skills in other areas: measurement, ratio, reading diagrams, performing calculations using fractions and decimals

## The Metric and Imperial Systems

Time Estimate: 2 hours

- Difficult area for many people
- Learners often need a fair amount of practice to master the systems and the conversions
- New vocabulary must be learned

## Military Time (24 hour clock)

Time Estimate: 30 minutes

- Straight-forward concept and procedure for converting times
- Casino staff often work around the need to use this notation format

## Percentages

Time Estimate: 2 hours

- Many applications within the workplace
- Familiar concept to most people
- Incorporates related concepts such as ratio and proportion
- Different methods of performing calculations

## Probability

Time Estimate: 4 hours

- Highly relevant concept for Casino staff
- Accuracy in calculating pay-outs is critical

- Requires specialized vocabulary
- Complex concept—not familiar to all people, and not covered in detail in the GED
- An excellent topic for group discussion in a class

The total estimated time needed to do a thorough review of the Foundation materials is approximately 21 hours. The breakdown of time is estimated assuming that classes will meet for two hours, with most of the topics reviewed over one or two classes.

# Training Plan Worksheet

## Step 1: Write the learning objectives.

1. What do you expect employees to be able to do on the job as a result of this training?
2. What learning objectives should trainees focus on first, second, third, etc.?
3. What do learners need to know or be able to do in order to participate in this training successfully?

### Effective learning objectives:

- Identify the learner (e.g. new Dealers.)
- State what learners should be able to demonstrate after the training.
- State how learners will demonstrate what you expect them to be able to do.

## Step 2: Identify the planning details of your training session:

### When, Who and How

1. How will you deliver the training? (For example, will it be in a classroom with a group of learners, one on one between a trainee and a trainer, or an assignment for trainees to do on their own and check in with a trainer at specified points)
2. What training methods, activities and questions will you use to ensure trainees achieve each of your learning objectives? (Use the training plan template following this worksheet to plan your training session in more detail.)
3. When will the training occur?
4. Who will deliver the training?
5. Where will the training be delivered?
6. What materials will you need to deliver the training? (For example, handouts for trainees, flip charts, laptop and projector, etc.)

**Step 3: Plan how you will evaluate your training.**

How will you determine whether or not the training has been effective? What tools can you use (For example: a survey, an on the job demonstration, at test, etc.)?

**Step 4: Identify and plan how you will follow-up with learners after the training.**

How will you determine whether or not trainees are applying their learning on the job?

**Step 5: Prepare the materials, equipment and training space.**

What can you prepare before the training begins that will make the session run smoothly for both you and the trainees?



## Communication Skills

### 1. Words

- ✓ Easy to understand (no jargon)
- ✓ Active sentences
- ✓ Avoid “um”, “uh” and “ok”

### 2. Tone

- ✓ Change volume, speed & tempo
- ✓ Pause to breathe
- ✓ Put emphasis on key words

### 3. Body Language

- ✓ Maintain eye contact
- ✓ Smile & nod
- ✓ Gesture with your arms & hands
- ✓ Avoid distracting habits (e.g., pacing, change in pockets)

## Top 10 Ways to Motivate Adults

1. Create a need. Ask: how will this information benefit you?
2. Develop a sense of personal responsibility. Ask: What do you want to achieve? What are you willing to do to get there?
3. Create and maintain interest. Ask questions to keep engagement
4. Structure activities to apply content to real life
5. Give recognition, encouragement and approval
6. Get excited yourself. Show your genuine enthusiasm for the topic
7. Establish long-range objectives. Show the big picture and the benefits in the long run
8. Link personal values and motives to OLG's values and objectives
9. Intensify interpersonal relationships – find commonalities
10. Give choices - Provide a variety of activities, questions and ideas

## Tips on Flip Charts

### In Advance

- ✓ Prepare flip charts the night before, if possible
- ✓ Create light pencil drawings for you to trace during the session
- ✓ Lightly pencil the next topic on the bottom of the page to remind you of what's coming
- ✓ Make your first page a title page or leave it blank

### Colour

- ✓ Use flip chart markers. They don't bleed through the paper
- ✓ Write with dark colours and use accent colours (red, orange, yellow, pink, etc.) to highlight
- ✓ Use only 2-3 colours per page
- ✓ Alternate colours when listing

### Lettering

- ✓ Follow the 7x7 rule: use no more than 7 words across and 7 lines to a sheet
- ✓ Ensure letters are at least 2-3" in height
- ✓ Leave plenty of white space
- ✓ Use printing, rather than handwriting

## 10 Tips To Prepare

1. Think about your audience
2. Be certain of your objective
3. Review your Facilitator Guide and note interactive sections
4. Anticipate how you will handle distractions
5. Personalize your opening and closing
6. Memorize opening
7. Do a practice run with the technical equipment (Smartboard, infocus machine, laptop)
8. Set up classroom and materials the night before
9. Arrive at least 1 hr early, set up and double check everything, then relax half an hour before
10. PRACTICE, PRACTICE, PRACTICE

# Facilitation Skills Quick Reference



To become a more effective facilitator, review the tips and techniques that can be applied to your sessions to enhance the overall learning experience.

## Communication Skills

Communication skills can be broken down into **3 groups:**

### 1. Words

- ✓ Easy to understand (no jargon)
- ✓ Active sentences
- ✓ Picture words
- ✓ Pronouns (especially "you")
- ✓ Avoid "um", "uh" and "ok"

### 2. Tone

- ✓ Change volume, speed & tempo
- ✓ Strive for variety
- ✓ Pause to breathe
- ✓ Put emphasis on key words

### 3. Body Language

- ✓ Maintain eye contact
- ✓ Smile & nod
- ✓ Gesture with your arms & hands
- ✓ Avoid distracting habits e.g. jingling change, pacing back and forth
- ✓ Maintain a comfortable distance from the learners

## Remember When Interacting...



- Ask and answer questions clearly.
- Listen attentively.
- Observe participants' behaviour & act accordingly.

## Phrasing Questions

Here are a few ideas about phrasing questions:

| Do   | Don't  |
|--|--|
| Ask clear, concise questions about one issue.              | Ask rambling, vague questions about many issues.                               |
| Ask reasonable questions based on what learners will know. | Ask questions that are too difficult or that learners won't be able to answer. |
| Ask challenging questions to provoke thoughtful answers.   | Ask questions which are too easy and don't let learners think.                 |
| Ask honest, relevant questions.                            | Ask "trick" questions designed to fool learners.                               |

## 10 Tips to Prepare

1. Think about your audience.
2. Be certain of your objective.
3. Personalize your opening and closing.
4. Review your Facilitator's Guide and note interactive sections.
5. Check everything.
6. Set up classroom and materials the night before.
7. Do a practice run with the infocus machine and laptop.
8. Memorize your opening.
9. Arrive at least 1 hour early, set up and double check everything, then relax half an hour before.
10. PRACTICE, PRACTICE, PRACTICE!

## Dealing with Stress

### Don't Take It Personally

Make a conscious effort to remember that participants are not angry with you; they are likely upset with the situation or an unrelated incident.

### Take a Walk

Remove yourself from the situation. On your break or at lunch take a short, brisk walk to clear your head.

### Use Creative Visualization

Imagine standing under a waterfall, as the water washes over you, picture the water washing your tension away. Or, pretend that you are sitting on a mountaintop, letting the breeze blow away your stress. Use your imagination to choose a visualization that works for you!

### Stretch

Try sitting up straight in your chair, and do neck rolls and shoulder shrugs. Neck and shoulder exercises are particularly useful for people that spend long periods of time at a computer.

### Focus on Breathing

Inhale for three counts, hold for two counts and exhale for five counts. Repeat several times. Deep breathing is a simple, yet effective method of relaxation.

### Be Active

Exercise and other physical activities can help you to release stress, clear your mind, reduce tension and increase energy.

### Get a Good Night's Sleep

It is difficult to cope when you are exhausted. Situations always seem harder to deal with when you are "running on empty".

### Have Fun!

Take the time to enjoy life and pursue interests outside of work. It may seem as though there is never enough time, but you need to take the time to recharge by participating in an activity that you enjoy or piques your interest.

### Meditate

Meditation does not always have to involve chanting or deep reflection; you can begin with deep, calm breathing and then move on to clear your mind of stressful thoughts. It can help you to feel less anxious and more in control.

### Laugh

Laughter is a wonderful stress reducer. Many studies have shown that happier people live longer, have less physical problems and are more productive.

## Tips on Flip Charts

### In Advance

- Prepare your flip charts the night before, if possible.
- Create light pencil drawings for you to trace during the session (the audience will not see these lines).
- Lightly pencil the next topic on the bottom of the page to remind you of what's coming.
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### Colour

- Use flip chart markers. They don't bleed through the paper.
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- Alternate colours when listing.

### Lettering

- Follow the 7x7 rule: use no more than 7 words across and 7 lines to a sheet.
- Ensure letters are at least 2-3" in height.
- Leave plenty of white space.
- Use printing, rather than handwriting.

## Benefits of Visual Aids

- ✓ Increase retention. With verbal instruction, retention is 10%. By adding visuals, retention jumps to 50%.
- ✓ Improve understanding.
- ✓ Appeal to multiple senses.
- ✓ Heighten interest.
- ✓ Help learners focus on the key message.
- ✓ Add to the variety of the learning experience.



## Body Language

- ✓ Change your position. Move around the room.
- ✓ Use gestures. Hand, head, and body movements can support your points.
- ✓ Let silence work for you. Use it to encourage reflection. If you ask a question wait 10 seconds for a response.
- ✓ Change tempo. With tone, volume, speed, fluctuate between loud and mellow, fast and slow, happy and sad, matter-of-fact and personal, fluent and hesitant.

## Responding to Difficult Questions

- "I don't know, but I will find out and get back to you."
- That's a good question. It relates to an issue we will cover shortly."
- Rephrase the question to your benefit.
- "Does anyone else have that particular concern?" If no, offer to deal with the question during the break.
- Ask for an example.
- Draw from the learners. "What advice do others have?"
- If the questions are off topic, offer to record it and follow up.



## Top 10 Ways to Motivate Adults

1. Create a need.
2. Develop a sense of personal responsibility.
3. Create and maintain their interest.
4. Structure activities to apply content to real life.
5. Give recognition, encouragement and approval.
6. Get excited yourself.
7. Establish long-range objectives.
8. See the value of personal motives.
9. Intensify interpersonal relationships.
10. Give them a choice.

# Buddy Trainer Quick Reference



## Getting Started

Prepare for your first meeting. Greet the Rookie with enthusiasm and introduce yourself. The Rookie might be a little nervous so try to put them at ease. Tell them a little about yourself, your experience and why you think you were selected as a Buddy Trainer.

Goals for this meeting:

- Review the goals of the training and explain more about your role
- Introduce the 4-steps of the Buddy System
- Introduce the ICM and P&P manual and explain their purpose in the department
- Introduce the checklists that will be used during training
- Answer any questions the rookie has before starting
- Review the Learning Map and pencil in dates for when each module should be completed.
- Explain to the Rookie that should they feel uncomfortable with any aspect of the training program they are welcome to speak to you about it or with your Department Manager.

## Pre-Shift Meetings

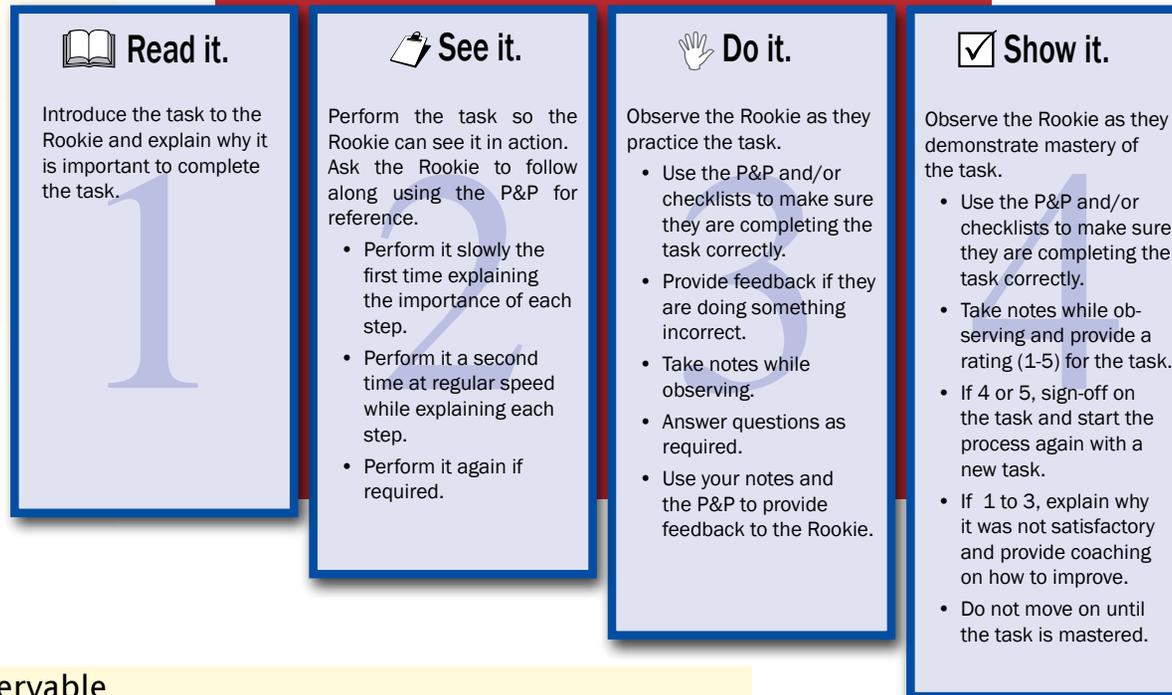
Before starting training each day, sit down with the Rookie to review the goals for the day. Plan 5 to 15 minutes depending on how much of the training is completed.

These regular meetings are a good time to discuss the Rookie's progress and answer any general questions they may have. If you have major concerns with the progress of the Rookie discuss them with your Department Manager.

If the Rookie is going to work with another team member to learn a task, this is a good time to make the introduction if necessary.

Remember these meetings are confidential and are not to be shared with anyone except the Department Manager.

## The Buddy Training System



## Post-Shift Meetings

Before the end of the day, take 5 to 10 minutes to sit down with the Rookie to discuss the day's achievements or challenges. Celebrate success when required, especially if the Rookie did something outstanding or completed a difficult task that they had previously struggled with.

Review which tasks you completed during the day and ask the Rookie if they have any questions about the tasks completed.

Quickly review what you will be covering during the next training shift and who the Rookie will be working with it is a different team member.

After the meeting, note anything of importance to discuss during your regular check-in meetings with your Department Manager.

## Not All Tasks Are Observable

You may find that not all the information in the ICM and P&P is a task that you can demonstrate and have the Rookie practice. If the section you are reviewing is not observable, spend more time discussing the importance of the item and how it relates to compliance. When the Rookie is ready, ask them to explain it back to you focusing on the why it is important and the compliance implications.

# Essential Skills for the Gaming Industry

## Casino Math



# Foundation Section

## Algebra



$$-20 \times \frac{9}{5} + 32 = F$$

$$(6 \div 6) : (12 \div 6) = 1:2$$



# Teaching Tips

When you teach algebra, explain the **order of operation**:

When expressions have more than one operation, we have to follow rules for the order of operations:

1. First, do all operations that lie inside parentheses.
2. Next, do any work with exponents or radicals.
3. Working from left to right, do all multiplication and division.
4. Finally, working from left to right, do all addition and subtraction

For example:

$$2 + (6 - 2)^2 \div 8 - 10 \times 2 =$$

First perform operation inside parentheses:

$$2 + 4^2 \div 8 - 10 \times 2 =$$

Then work with exponents:

$$2 + 16 \div 8 - 10 \times 2 =$$

Then multiply and divide:

$$2 + 2 - 20 =$$

Finally work from left to right, do all addition and subtraction:

$$2 + 2 - 20 = -16$$

When you think that you have solved an equation, you can prove it by replacing the variable (e.g. “n”) with the number that you think is the answer. For example:

$$\text{Given } 3n + 5 = 23$$

If you replace  $n$  with the number 2, it looks like this:

$$3 \times 2 + 5 = 23$$

$$6 + 5 = 23$$

$$11 \neq 23$$

You come up with a false equivalent. This means that 2 is not the solution.

If you replace  $n$  with the number 6, it looks like this:

$$3 \times 6 + 5 = 23$$

$$18 + 5 = 23$$

$$23 = 23$$

You come up with a true equivalent. This means that 6 is the solution.

To practice using order of operations, ask learners to create equations using questions they would use in their work. For example:

**For a lottery ticket seller:**

Four people bought a lottery ticket together for \$100.00. The first spent twice as much as the second, and the third spent \$5.00 more than the fourth. How much did each person spend?

**For a maintenance worker:**

You have a P-card that allows you to make emergency purchases for up to \$100.00. You need to buy a tape measure (\$14.95), a 4-litre container of mastik for ceramic tile (\$12.25 each L) and 5 ceramic tiles (\$1.38 each) to finish a small but top-priority job. Can you buy these materials with your P-card?

**For a housekeeping and grounds worker:**

You are a ground's worker. During the summer, you are responsible for cutting and maintaining the lawns, weeding flowerbeds, trimming hedges and keeping the area free of trash. During the winter, you are responsible for keeping all the walkways clear of snow and ice. Your regular work schedule is Wednesday to Saturday, 0900 to 1900 hrs. Your wages are \$9.50 per hour for a 36-hour week.

Every 2 weeks you must trim the hedges. It takes you approximately  $2\frac{1}{2}$  hours to do this using a power hedge trimmer, and about 4 hours to do it with manual trimmers. The fuel needed to do the job costs just over \$3.00. Which is the more cost-effective way to trim the hedges?



## Ratio and Proportion

You can use a recipe for a certain number of cookies and ask students to list the amount of each ingredient they would need to bake double the number of cookies, triple the number, or half the number.

Let's say you have a recipe that makes three dozen cookies:

- 1 cup flour
- $\frac{1}{2}$  tsp. baking soda
- $\frac{1}{2}$  tsp. salt
- $\frac{1}{2}$  cup butter
- $\frac{1}{3}$  cup brown sugar
- $\frac{1}{3}$  cup sugar

1 egg  
1/2 tsp. vanilla  
1 cup chocolate chips

To make nine dozen cookies, you'll have to increase the amount of each ingredient listed in the recipe. You'll also need to make sure that the relationship between the ingredients stays the same.

Once the ingredients are listed you can play with writing the proportions from the original recipe and the new one, and show them that in order to keep the recipe, it is necessary to keep proportions the same.

For each learner, try to use materials they would use in their work. For example:

- Ask a housekeeping worker how they would triple and quadruple a mix of cleaning solution.
- Ask a maintenance worker how they would find out if the per kilowatt cost of their fuel consumption for the casino had increased this month over last month.
- Ask a uniforms worker to decide how much material is needed to make ten uniforms, based on the material used for one uniform.

# Introduction

Some jobs that need  
Algebra skills

Animatronics Operator  
Bank Supervisor  
Banquet Supervisor  
Bartender  
Bingo Volunteer Coordinator  
Bingo/Keno Cashier  
Bingo/Keno/Video (BKV) Attendant  
(Caller / Checker)  
BVK Supervisor  
Casino Bank Cashier  
Cook  
Chef  
Department Manager  
Dining Room Supervisor  
Facility Technician  
Facilities Supervisory  
Guest Services Representative  
Guest Services Supervisor  
Hostess/Host  
Housekeeping Attendant  
Housekeeping Supervisor  
Investigative Security Officer  
Maintenance Technician  
Retail Cashier  
Retail Supervisory  
Security Officer  
Security Supervisor  
Senior Cashier  
Senior Clerk Typist  
Server  
Shuttle Bus Driver  
Slot Attendant  
Slot Floor Supervisor  
Surveillance Technician  
Switchboard Operator  
Table Games Inspector  
Technical Support Supervisor  
Uniforms Technician  
Uniforms Supervisor  
Valet Attendant  
Warehouse Clerk  
Warehouse Supervisor/Banquet  
Supervisor  
Bartender  
Bingo Volunteer Coordinator  
Bingo/Keno Cashier  
Bingo/Keno/Video (BKV) Attendant  
(Caller / Checker)  
BVK Supervisor  
Casino Bank Cashier  
Cook  
Chef  
Department Manager  
Dining Room Supervisor  
Facility Technician  
Facilities Supervisory

**A**lgebra is the branch of math that deals with numbers in the abstract. By learning algebra, you learn how to create math equations to reflect different situations you may face in your work. You can then use these equations to solve for an unknown value.

Algebra is used throughout the gaming industry. For example, you would use algebra to:

- Calculate wins and losses in a game of roulette
- Calculate the ratio of clubs to spades in a card game
- Calculate how to mix drinks, using ratios
- Compare how many women and how many men came to the casino on different days of the week

Two ideas that link arithmetic and algebra are **signed numbers**, also known as **integers**, and **ratio/proportion**.

In this section you will learn how to:

- Add and subtract integers
- Multiply and divide integers
- Read ratios
- Write ratios
- Find equal ratios
- Break down a total using ratios
- Write an equation
- Solve an equation





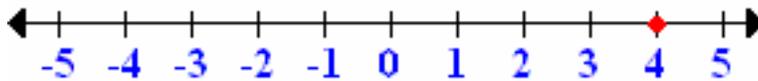
# Integers:

**I**ntegers are **numbers** that appear **on a number line**. They are not useful as “counting” numbers, but they are used for other purposes, such as showing debits or credits, temperature and positions on grids.

Each of these numbers is an integer:

- 5 C (temperature)
- \$2,040 (debits)
- 300 meters level of the sea (under the sea)

This is a number line:



## Skill 1:

## Add and Subtract Integers

TELL  
ME



Here are the three ways to add and subtract integers:

1. If the **signs are the same**, find the **sum** and **use the same sign**.
2. If the **signs are different**, find the **difference** and **use the sign of the larger number**.
3. If there is a list of **numbers with both signs**, **combine all negative values** and **combine all positive values**. Then find the **difference** between the two amounts and **use the sign of the larger number**.

## SHOW ME



To add and subtract integers, you would do the following:

If the signs are the same, use this sign for the answer.

$$+3 + 4 + 5 = +12$$

$$-5 - 6 - 3 = -14$$

If the signs are different:

$$-45 + 33 = -12 \quad \dots \text{when the larger number is negative, the answer is negative.}$$

$$-21 + 67 = +46 \quad \dots \text{when the larger number is positive, the answer is positive.}$$

If there is a list of numbers with both signs, first combine all negative values and combine all positive values. Next, find the difference between the two amounts and use the sign of the larger number.

$$+3 - 8 + 5 - 10 + 12 - 15 =$$

$$+20 \quad (\text{total of all positive values})$$

$$-33 \quad (\text{total of all negative values})$$

$$+20 - 33 = -13 \quad (\text{difference, with the sign of the larger number})$$

Here is one more example of adding and subtracting integers:

It is  $-20^{\circ}\text{C}$  at 6:30 in the morning. By noon, the temperature has risen 8 degrees. When you write this as a math statement, it looks like this:

$$-20 + 8 = -12$$

At noon, the temperature is  $-12^{\circ}\text{C}$ .

## LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

1.1 You played at the table games last Friday. You won \$35.00, you lost \$17.50, you won \$11.00 and you lost \$43.00. How does your cash situation look now?

1.2 You owe the bank \$3,500.00. You borrow \$1,550.00 more, and you pay back \$900.00. How much do you owe the bank now?

## Skill 2: Multiply and Divide Integers

TELL  
ME



When you **multiply or divide** two numbers with **different signs**, the **answer** will be **negative**.

When you **multiply or divide** two numbers with the **same signs**, the **answer** will be **positive**.

SHOW  
ME



When you multiply or divide two numbers with different signs, the signs are different, so the answer is negative.

$$\begin{aligned}(-2)(+5) &= -10 \\ -100 \div +10 &= -10\end{aligned}$$

When you multiply or divide two numbers with the same signs, the signs are the same, so the answer is positive.

$$\begin{aligned}(-4)(-6) &= +24 \\ (+5)(+7) &= +35 \\ -150 \div -25 &= +6\end{aligned}$$

Here is another example of how to multiply and divide integers:

To find out what  $-20^{\circ}\text{C}$  is in temperature Fahrenheit, do this:

$$\text{Celsius temperature} \times \frac{9}{5} + 32 = \text{Fahrenheit temperature.}$$

Replace Celsius for  $-20$

$$-20 \times \frac{9}{5} + 32 = {}^{\circ}\text{F}$$

$$-36 + 32 = -4^{\circ}\text{F.}$$

The temperature Fahrenheit is  $-4^{\circ}\text{F}$ .

Reverse the formula to convert Fahrenheit temperature to Celsius:

$$\text{Temperature } ({}^{\circ}\text{F}) - 32 \times \frac{5}{9} = {}^{\circ}\text{C}$$

# LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

2.1 Convert the following Celsius temperatures to Fahrenheit using the formula shown in the Show Me:

a)  $+40^{\circ}\text{C} =$

b)  $-40^{\circ}\text{C} =$

c)  $+12^{\circ}\text{C} =$

2.2 Convert the following Fahrenheit temperatures to Celsius using the formula shown in the Show Me:

a)  $+35^{\circ}\text{F} =$

b)  $-34^{\circ}\text{F} =$

c)  $-10^{\circ}\text{F} =$

# Ratios

## Skill 1: Read and Write Ratios

TELL  
ME



A ratio shows the relation between two things. A ratio can be written several different ways. For example, you can write the **ratio** between  $a$  to  $b$  by doing the following:

|   |               |
|---|---------------|
| Writing the ratio as a fraction         | $\frac{a}{b}$ |
| Using the word "to" to link $a$ and $b$ | $a$ to $b$    |
| Separate $a$ and $b$ with a colon       | $a:b$         |

SHOW  
ME



Here are some examples of writing ratios.

We can write the ratio of hearts to diamonds three different ways.



|  |               |
|--|---------------|
| Write a ratio as a fraction.<br>This is the most common way. | $\frac{3}{4}$ |
| Write the ratio using the word "to".                         | 3 to 4        |
| Write this ratio using a colon between the two numbers.      | 3:4           |

For mixing drinks, the usual ratio of spirits to mix is 1 part spirits to 5 parts mix, or, in math terms 1:5. This means that for every 1 part of spirits, 5 parts mix will be added to make a drink.

LET ME  
TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 1.1 A beer costs four dollars and a margarita costs six dollars. Write the ratio of the cost of the beer to the cost of a margarita.

## Skill 2: Find an Equal Ratio

TELL  
ME



There are **two ways** to find an equal ratio.

1. Multiply each term of a ratio by the same nonzero number.
2. Divide each term of a ratio by the same nonzero number.

To find out if two separate ratios are equal, divide the first number by the second for each ratio. Compare the different ratios. If the quotients are equal, then the ratios are equal.

### **Multiply to Make a Ratio Equal**

Multiply each term of a ratio by the same nonzero number to give an equal ratio.

If we multiply both terms in the ratio 1:4 by 7, we get the equal ratio, 7:28.

$$(1 \times 7):(4 \times 7) = 7:28$$

### **Divide to Make a Ratio Equal**

Divide each term of a ratio by the same nonzero number to give an equal ratio. If we divide both terms in the ratio 6:12 by the number six, then we get the equal ratio, 1:2.

$$(6 \div 6):(12 \div 6) = 1:2$$

Here are some examples of finding equal ratios.

To prepare a drink, the ratio of spirits to mix is 1:5. To prepare 6 drinks, multiply both numbers in the ratio by 6 to find the amount of spirits and mix.

$$1(\times 6):5(\times 6) = 6:30$$

This means that you need 6 parts spirits and 30 parts mix to make 6 drinks.

To make a certain shade of paint, you have to mix blue, white and yellow tints in the following ratio: 6:3:1 or 6 parts blue to 3 parts white to 1 part yellow tint.

To double the amount of paint, you can get the same shade by doubling each number in the ratio:

$$(6 \times 2):(3 \times 2):(2 \times 2) = 12:6:2.$$

This means you should mix 12 parts blue to 6 parts white to 2 parts yellow.

## **SOMETHING TO CONSIDER**

The order in which the variables are given must be consistent. This means, in our example, you would keep the order of the paint colours as blue, white and yellow in your equation.

To compare different ratios, divide the first number by the second for each ratio. If the quotients are equal, then the ratios are equal. For example:

The ratio 1:4 equals 7:28. In each case, the quotients are 0.25.

$$1 \div 4 = .25$$

$$7 \div 28 = .25$$

The quotients are equal  $\longrightarrow$  the ratios are equal.

The ratio 3:12 does not equal the ratio 36:72. This is because

$$3 \div 12 = 0.25 \text{ and } 36 \div 72 = 0.5.$$

The quotients are not equal  $\longrightarrow$  the ratios are not equal.

LET ME  
TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answer.

2.1 The ratio of cleaning solution to water is 2:5. How much water should I use with 16 oz of cleaning solution?

### Skill 3:

## Infer and Solve Ratios From Word Problems

TELL  
ME



People often use ratios to make solving word problems easier. This involves **gathering information** from the problem that is not directly stated in words. Gathering this information is called **inferring**.

If you know that the ratio between two different things,  $a$  and  $b$ , is  $a:b$ , you may also infer two other ratios. For example:

$a:(a + b)$  is the ratio between  $a$  and the total

$b:(a + b)$  is the ratio between  $b$  and the total

These ratios can help you infer the absolute number of  $a$  and  $b$ .

Multiply the new ratios by the absolute amount between  $a$  and  $b$ .

**SHOW  
ME**



The ratio of male to female staff at a certain company is 5:2.

### SOMETHING TO CONSIDER

The numbers used in the ratio might not be the absolute references. The ratio "5 to 2" just tells you that, for every five men, there are two women. There may be 5, 10, 15 or more men, and 2, 4, 6 or more women.

This means that if there were 7 people ( $5 + 2$ ), 5 of them would be men and 2 would be women.

If there is a larger group, you can calculate the number of men and women in this way.

If there are 84 employees altogether:

$\frac{5}{7}$  are men and  $\frac{2}{7}$  are women. Those are the ratios you inferred from 5:2.

$\frac{5}{7} \times 84 = 60$     $\frac{2}{7} \times 84 = 24$  Multiply each ratio by the absolute amount between men and women. In this case, that amount is 84.

This means 60 are men and 24 are women.

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 3.1 The ratio of supervisors to workers is 2:9. How many supervisors will be on-hand if there are 342 workers on site?
- 3.2 A class of 42 students has 14 girls. What is the ratio of boys to girls?



# Proportions

Proportions are **statements of equal ratios**. They are useful in many situations, from **calculating amounts** in a mixed drink to **calculating odds** of winning a game.

## Skill 1: Write a proportion

TELL  
ME

A proportion can be written in two ways:

|                        |                             |
|------------------------|-----------------------------|
| As two equal fractions | $\frac{a}{c} = \frac{b}{d}$ |
| Using a colon          | $a:b = c:d$                 |

When **two ratios are equal**, then the **cross products** of the ratios are **equal**. That is, for the proportion,  $a:b = c:d$ ,  $a \times d = b \times c$ .

### SOMETHING TO CONSIDER

One of the most common examples of a proportion is a **percentage**. Refer to the percentage section for review.

**SHOW  
ME**



You have to mix fuel in a ratio of 15 parts gas to 1 part oil. To calculate how much gas you must mix with 5 parts oil, set up a proportion:

$$\frac{\text{Gas}}{\text{Oil}} = \frac{15}{1} = \frac{x}{5}$$

### SOMETHING TO CONSIDER

Notice that we have used  $x$  for unknown number of gas since it is common in algebra to use the letter  $x$  as a variable.

Cross-multiply to solve:

$$\begin{aligned} 15 \times 5 &= 1(x)75 = 1(x) \\ 75 &= x \end{aligned}$$

You will need 75 parts of gas with 5 parts oil.

The study of ratio and proportions shows us how real problems can be translated into math terms and solved.

Refer to the discussion of percentages for other examples of ratios and proportions.

**LET ME  
TRY**



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answer.

1.1 If  $4:9 = 63:x$ , find  $x$ .

# Equations

**A**n **equation** is a statement that **says that two quantities are equal**. An algebraic equation is made of two algebraic expressions separated by an equal sign.

The equal sign is the key sign in algebra. This sign is not the same equal sign we use in arithmetic. When we write  $3 + 5 = 8$ , this is a correct arithmetic statement. This equal sign means “ $3 + 5$  is the same as  $8$ ”. The equal sign in arithmetic is part of a correct statement.

The equal sign in algebra defines one expression in terms of another. This equal sign is part of a question to solve. In solving practical problems, this equal sign defines the unknown quantity in terms of known quantities.

The algebraic equation  $x + 3 = 8$  is a question more than a statement. In this case, the question is: What number can replace the  $x$  to make this statement right?

If you answer  $x = 5$ , the statement becomes correct. If you answer incorrectly, the statement becomes incorrect.

## Skill 1:

### Write an Equation from a Word Problem

TELL  
ME



To write an equation from a word problem, follow these steps:

1. **Read** the problem **carefully** and figure out what it is asking you to find.
2. **Assign** a variable to the quantity you are trying to find. e.g.  $x$ , or  $n$ , etc.
3. Write down **what** the **variable represents**.
4. See what **relationship** there is between this variable and the quantities given in the problem.
5. **Write** this **relationship** into an **equation**.

## SHOW ME



When 6 is added to four times a number, the result is 50. To find the number:

1. Ask yourself what you are trying to find. In this case, it is a number.
2. Assign a variable for the number:  
Let's call it  $n$ .
3. Write down what the variable represents:  
Let  $n =$  a number
4. See the relationship between this variable and the numbers already given:  
We are told 6 is added to 4 times a number. Since  $n$  represents the number, four times the number would be  $4n$ . If 6 is added to that, we get:  $6 + 4n$ .
5. Write an equation.  
We know that the result of that sum is 50, so now we have an equation:  
 $6 + 4n = 50$

## LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 1.1 Write an equation to show that Saturday's attendance was three times Thursday's attendance.
- 1.2 Write an equation to represent each of the following situations:
  - a) There are five times as many workers ( $w$ ) as supervisors ( $s$ ).
  - b) The total length of a statue of an alligator being placed in the casino lobby is 14 feet. The statue's head is half as long as its body, and its tail is twice as long as its body. How long is each part of this statue?
  - c) The sale price of an item equals  $\$S$ . The sale discount is 25%. What is the regular price  $\$R$ ?

1.3 Write an equation that shows Harry's weight is equal to one-third of Ben's weight.

1.4 Write an equation that shows total attendance for men and for women for three days as listed below:

|           |                       |
|-----------|-----------------------|
| Monday    | 335 women and 184 men |
| Tuesday   | 351 women and 118 men |
| Wednesday | 299 women and 165 men |

1.5 Write an equation that shows how to calculate the average of the following elevations:

242.5 feet

331.2 feet

310.3 feet

400.4 feet

## Skill 2:

# Solve an Equation

TELL  
ME



You can deal with many situations by writing them out as equations and solving them using the following steps:

1. **Write** the situation as an **equation**.
2. **Combine** the unknown  $x$ .
3. **Divide** both sides by the same factor to isolate  $x$ .
4. **Cancel** common factors.
5. **Re-write** the equation.
6. **Calculate**  $x$ .
7. **Check** the answer in the first equation.

## SOMETHING TO CONSIDER

When you take an equation and modify both its sides in exactly the same way, what you get is also a valid equation.



Here is an example of how to solve an equation:

A vending machine is on sale for 20% off retail.  
The sale price is \$495.00. What was the original price?

If you express the situation in words, you could say “some amount minus 20% of that same amount equals \$495.00”.

1. Write the situation as an equation.

Using  $x$  for the unknown amount, the problem can be written in math terms.

$$x - 20\%x = \$495.00$$

## SOMETHING TO CONSIDER

Remember that the whole number is equivalent to 100% of the number.

2. Combine the unknown  $x$ .

$$100x - 20x = 80x$$

$$\text{So } 80x = \$495.00.$$

3. Divide both sides by the same factor to isolate the  $x$ .

$$80\% = \$495.00$$

$$\frac{80\% x = \$495.00}{80\% \quad 80\%}$$

4. Cancel common factors.

$$\frac{\cancel{80\%} x = \$495.00}{\cancel{80\%} \quad 80\%}$$

5. Rewrite the equation.

$$x = \$495.00$$

$$0.80$$

## SOMETHING TO CONSIDER

To write the percentage as a decimal, remove the percentage sign and multiply the percentage value by 0.01. (Move the decimal point two places to the left, e.g.  $80\% = 0.80$ .)

6. Calculate  $x$ .

$$x = \$618.75 \text{ (the original price)}$$

7. Check the answer in the first equation.

$$618.75 - 20\% \ 618.75$$

$$618.75 - 123.75 = 495.00$$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 2.1 The Maintenance Department bought six new power drills on sale for 15% off the regular retail price. If the sale price was \$960.00 for the six machines, what was the regular retail price per machine?
- 2.2 The retail outlet at the **Ten Mile Island Casino** needs to make  $7\frac{1}{2}\%$  profit over last year's net income. The net income last year was \$18,650.00. What does the outlet need to make this year to achieve their goal?
- 2.3 Write the equations and solve for  $x$ :
  - a)  $x$  decreased by 5 equals ten.
  - b) The difference between  $x$  and ten equals fourteen.
  - c) Two times nine divided by  $x$  equals three.
- 2.4 Three people bought a lottery ticket together for \$100.00. Albert spent one-half as much as Fred, and Dave spent \$10.00 more than Fred. How much did each person spend?
- 2.5 The length of a rectangle is 4 more than 3 times the width. The perimeter is 152 metres. Calculate the length and width in metres.



Compare your answers for Let Me Try and Challenge My Skills activities below. If you have less than half the answers correct, review the material and try the activities again.

## Integers

### Skill 1: Add and Subtract Integers

1.1  $+\$35.00 - \$17.50 + \$11.00 - \$43.00 = +35 + 11 - 17.50 - 43 = +46 - 60.50 = \$14.50$ . I have \$14.50 less than I had before I started playing.

1.2  $(\$3,500.00 + \$1,550.00) - \$900.00 = \$4,150$

### Skill 2: Multiply and Divide Integers

2.1

- a)  $104^{\circ}\text{F}$
- b)  $-40^{\circ}\text{F}$
- c)  $53.6^{\circ}\text{F}$

2.2

- a)  $+1.67^{\circ}\text{C}$
- b)  $-36.7^{\circ}\text{C}$
- c)  $-23.3^{\circ}\text{C}$

## Ratios and Proportions

### Skill 1: Read and Write Ratios

1.1  $4:6 = 2:3$  or 4 to 6 = 2 to 3 or  $4 = \frac{2}{6} = \frac{2}{3}$

### Skill 2: Find an Equal Ratio

2.1 You need 40 oz of water with 16 oz of cleaning solution.

## Skill 3: Infer and Solve Ratios from Word Problems

3.1 There should be 76 supervisors and 342 workers.

3.2 There are two boys to every girl.

## Proportion

### Skill 1: Write a Proportion

1.1  $x = 141.75$

## Equation

### Skill 1: Write an Equation from a Word Problem

1.1  $3(\text{Thurs}) = \text{Sat}$ .

1.2

a)  $5s = w$

b) Let  $x =$  the length of his body.  $\frac{1}{2}x =$  his head, and  $2x =$  his tail.

$$\frac{1}{2}x + x + 2x = 14 \text{ ft.}$$

$$3\frac{1}{2}x = 14. \quad x = 4 \text{ ft.}$$

Head = 2 ft., body = 4 ft., tail = 8 ft.

Total = 14 ft.

c)  $R - 0.25(R) = S$

1.3  $B = 3H$

1.4  $(335 + 351 + 299) + (184 + 118 + 165) =$  Total attendance for both men and women.

Order of operations dictates that you have to add up the numbers in brackets first, and this will give you totals for each gender.

1.5  $\frac{242.5 + 331.2 + 310.3 + 400.4}{4} =$  Average elevation



# Foundation Section

## Counting Cash





# Teaching Tips

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## Teaching Tip 1

If trainees are using calculators to carry out multiple operations, let them know that not all calculators follow the general rules for the order of operations. As a result, they may get a different answer. See Algebra Teaching Tip 1 to learn more about the order of operations.

## Teaching Tip 2

Show trainees the following short cut for multiplying by tens, 100s, 1000s, etc. Simply add the number of zeros in the factor (e.g. 10, 100, etc) to the integer number being multiplied.

For example, to find out how much money 64 \$100 bills are, simply add two zeros to 64:

$$64 \$100.00 \text{ bills} = 64 \times 100 = 6400$$

## Teaching Tip 3

Show trainees the following short cut for multiplying decimal numbers by 10, 100, 1000 etc. Simply move the decimal point to the right the same number of places as there are zeros in the factor number. For example, if multiplying by 100, then move the decimal two places to the right. If need be, add more zeros to fill in the correct number of places.

For example, say that a bag of quarters contains 100 quarters. To figure out quickly how much 100 quarters (\$0.25) is in dollars, simply move the decimal two places to the right:

$$\$ 0.25 \times 100 \text{ ---> } .25 \text{ ---> } \$ 25.00$$


If that bag had 1000 quarters, then move the decimal point three places to the right:

$$\$ 0.25 \times 1000 \text{ ---> } .250 \text{ ---> } \$ 250$$


# Introduction

Casino workers handle many forms of currency: cash, vouchers, coupons, chips and credit and debit cards. Accurate cash counting is a major responsibility for all workers who handle currency. Money Math skills are very important for casino workers.

To do Money Math, you must calculate with decimal numbers. This is because dollars and cents reflect the decimal value of dollars. In other words, 10 dollars and 53 cents is the same thing as 10.53 dollars (10 and 53/100 dollars), or \$10.53.

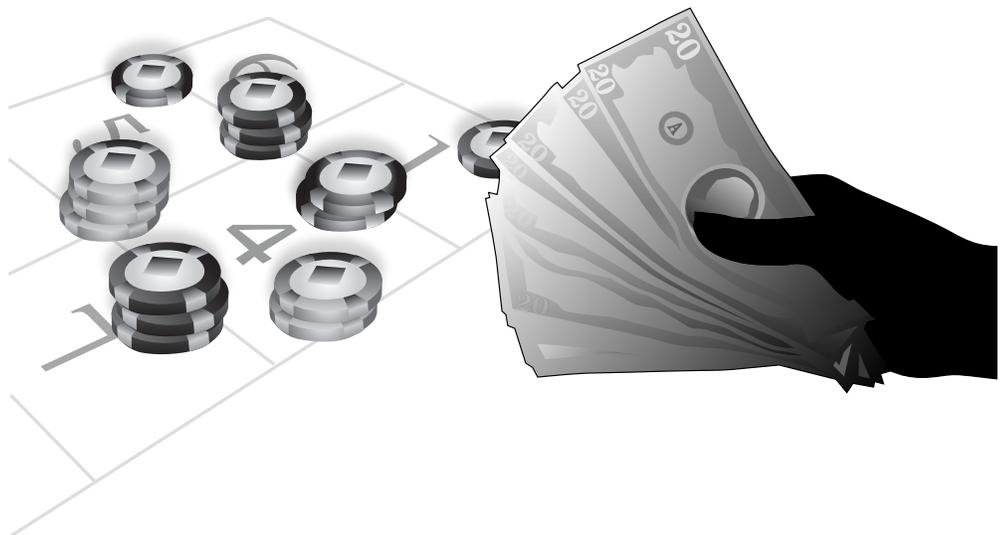
Read the discussion of decimal numbers and calculations if you need practice with decimals.

In this section you will learn how to:

- Control Cash
- Calculate Tips
- Check Calculations Done by Someone Else
- Count Coins
- Count Large Amounts of Money
- Calculate Cash Value of Chips
- Convert US Currency to Canadian Currency
- Convert Canadian Currency to US Currency

Some jobs that need Cash Counting skills

- Bank Superior
- Banquet Supervisor
- Bartender
- Bingo/Keno Cashier
- Casino Bank Cashier
- Bingo/Keno/Video (BVK)
- Attendant (Caller/Checker)
- Casino Bank Cashier
- Cook, Dealer
- Dining Room Supervisor
- Facilities Supervisor
- Guest Services
- Representative
- Guest Services Supervisor
- Housekeeping Supervisor
- Maintenance Technician
- Security Supervisor
- Senior Cashier
- Server
- Shuttle Bus Driver
- Slot Attendant
- Surveillance Technician
- Switchboard Operator
- Technical Support
- Supervisor
- Uniforms Supervisor
- Valet Attendant





# Cash on Hand

“**Cash on hand**” is the amount of money that includes **cash, coupons and vouchers**. Many casino workers need to know how to calculate cash on hand.

Cash on hand may include a “float”. A “float” is a reserve of cash that casino workers use to make change while serving clients. This float must be accounted for at the beginning and end of each shift.

## Skill 1: Control Cash

TELL  
ME



To calculate cash on hand, follow these steps:

- **Multiply** the **value** of each coin by the **number of coins** of the same value.  
– For example: 10 loonies =  $10 \times \$1.00 = \$10.00$
- **Multiply** the **value** of each bill by the **number of bills** of the same value.  
– For example: Six five dollar bills =  $6 \times \$5.00 = \$30.00$
- **Add** the total **value** of **coins** and **bills** to get the total value of the cash.  
– For example:  $\$30.00$  (bills) +  $\$10.00$  (coins) =  $\$40.00$  cash
- **Multiply** the **value** of each **coupon** by the **number of coupons** of the same value.  
– For example: Five 10 dollar coupons =  $5 \times \$10.00 = \$50.00$  in coupons
- **Multiply** the **value** of each **voucher** by the **number of vouchers** of the same value.  
– For example: Five 5 dollar vouchers =  $5 \times \$5.00 = \$25.00$  in vouchers
- **Add** all the total **value** of the **cash, coupons and vouchers**.  
– For example:  $\$40.00$  (cash) +  $\$50.00$  (coupons) +  $\$25.00$  (vouchers) =  $\$115.00$  Total



Below is a cash slip of all the currency that a casino cashier has on hand:

**Coins**

13 toonies  
51 loonies  
44 quarters  
10 dimes  
5 nickels  
8 pennies

**Bills**

13 x \$5.00  
26 x \$10.00  
155 x \$20.00  
14 x \$50.00  
15 x \$100.00

**Coupons**

11 x \$10.00  
19 x \$5.00

**Vouchers**

4 x \$25.00

To calculate the total value of the currency listed on the cash slip, the cashier first calculates the coins:

**Coins**

|                      |                    |         |
|----------------------|--------------------|---------|
| 13 toonies           | $13 \times \$2.00$ | \$26.00 |
| 51 loonies           | $51 \times \$1.00$ | \$51.00 |
| 44 quarters          | $44 \times \$0.25$ | \$11.00 |
| 10 dimes             | $10 \times \$0.10$ | \$ 1.00 |
| 5 nickels            | $5 \times \$0.05$  | \$ 0.25 |
| 8 pennies            | $8 \times \$0.01$  | \$ 0.08 |
| Total value of coins |                    | \$89.33 |

Next, the cashier calculates the bills:

**Bills**

|                      |                      |            |
|----------------------|----------------------|------------|
| 13 \$5 bills         | $13 \times \$5.00$   | \$65.00    |
| 26 \$10 bills        | $26 \times \$10.00$  | \$260.00   |
| 155 \$20 bills       | $155 \times \$20.00$ | \$3,100.00 |
| 14 \$50 bills        | $14 \times \$50.00$  | \$700.00   |
| 15 \$100 bills       | $15 \times \$100.00$ | \$1,500.00 |
| Total value of bills |                      | \$5,625.00 |

**To find the total value of the cash**, the cashier adds the total value of coins and bills:

**Total value of cash:**

$$\$89.33 + \$5,625.00 = \$5,714.33$$

The cashier then calculates the coupons:

**Coupons**

|                        |                     |          |
|------------------------|---------------------|----------|
| 11 \$10 coupons        | $11 \times \$10.00$ | \$110.00 |
| 19 \$5 coupons         | $19 \times \$5.00$  | \$95.00  |
| Total value of coupons |                     | \$205.00 |

Next, the cashier calculates the vouchers:

### Vouchers

|                         |                    |          |
|-------------------------|--------------------|----------|
| 4 \$25 vouchers         | $4 \times \$25.00$ | \$100.00 |
| Total value of vouchers |                    | \$100.00 |

The cashier adds up the total value of coupons and vouchers:

### Total Value of Coupons and Vouchers:

$$\$110 + \$95 + \$100 = \$305$$

For the total value on the cash slip, the cashier adds the total value of cash to the total value of coupons and vouchers:

### Total value on cash slip:

$$\$5,714.33 + \$305 = \$6,019.33$$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

1.1 Pierre has the following bills that he will use as a float. How much is his float?

- 45 \$5.00 bills
- 37 \$10.00 bills
- 48 \$20.00 bills
- 13 \$50.00 bills

1.2 Rebecca has the following bills that she will use as a float. How much is Rebecca's float?

- 97 \$5.00 bills
- 46 \$10.00 bills
- 239 \$20.00 bills
- 88 \$50.00 bills
- 64 \$100.00 bills

# Skill 2:

# Calculate Tips

TELL  
ME



To calculate their tips, casino workers do the following:

- **Add the float and the receipts.**
- **Subtract cash on hand from the total of the float and receipts**
- **Tips = Cash on Hand at any time - (Float + Receipts)**

SHOW  
ME



Kristine works in the lounge. She begins her shift with a \$60.00 cash float. At the end of the evening, she calculates her tips. She totals her receipts first:

Her receipts are:

| Drinks        | Food Orders   |
|---------------|---------------|
| \$6.50        | \$10.95       |
| \$4.35        | \$11.50       |
| \$3.75        | \$5.75        |
| \$3.75        | \$12.75       |
| \$4.75        | \$10.95       |
| \$3.75        | \$10.95       |
| \$4.50        |               |
| \$1.30        |               |
| \$1.30        |               |
| \$1.30        |               |
| TOTAL \$35.25 | TOTAL \$62.85 |

Next, Kristine adds her float and receipts together:

$$\$60 \text{ (float)} + \$35.25 \text{ (drinks)} + \$62.85 \text{ (food)} = \$158.10$$

To find her cash on hand, she adds her coupons and cash:

$$\begin{aligned}\text{Coupons} + \text{Cash} &= \text{Cash on hand} \\ \$35.00 + \$153.45 &= \$188.45\end{aligned}$$

Kristine subtracts her floats and receipts from her cash on hand. This is the total of her tips:

$$\begin{aligned}\text{Tips} &= \text{Cash on hand} - (\text{float} + \text{receipts}) \\ \text{Tips} &= \$188.45 - (\$158.10) \\ \text{Tips} &= \$30.35\end{aligned}$$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 2.1 Maria works in the cafeteria. She started her shift with a \$45 cash float. When she completed her shift she had \$78.25 receipts in drinks, \$43.20 receipts in food and \$30 in vouchers.
- If her cash was \$205, how much did she have in tips?
  - What was her cash on hand?

### Skill 3:

## Check Calculations Done by Someone Else

TELL  
ME



Some casino workers are responsible for checking invoices to make they are correct.

To check prices and totals given on suppliers' invoices:

- **Multiply** the **quantity** ordered by the **unit price** of each item. This gives the net price of each item.
- **Add** all **net prices** to check the subtotal.



A maintenance supervisor must review all invoices before he submits them to Accounts Payable for payment.

Brian has ordered bathroom fixtures to upgrade the staff washrooms. His warehouse worker told him that all items on order were received. Brian is reviewing the invoice shown below:

**To: Four Rivers Casino**  
**From: Smith Builders**  
**Delivered to: Four Rivers Casino**  
**Attention: Brian McFinney**

**Purchase Order: Four Rivers 3441 Invoice No. 40958M Date:Mar 1/06**

| Qty Ordered | Item/Number                | Unit Price | Net Price         | Rec'd |
|-------------|----------------------------|------------|-------------------|-------|
| 4           | PQ45 Qt paint – color 45   | \$9.99     | \$39.96           | 4     |
| 105         | C408 Ceramic Tiles (Ash)   | \$0.97     | \$101.85          | 105   |
| 23          | L101 Lavatories (White)    | \$58.45    | \$1,344.35        | 23    |
| 25          | TT 90 Toilet Tanks (White) | \$65.75    | \$1,645.75        | 25    |
| 25          | TTC90 Toilet Tank Covers   | \$19.97    | \$499.25          | 25    |
|             | <b>Subtotal</b>            |            | <b>\$3,631.16</b> |       |

Brian checks the net price:

$$4 \times \$9.99 = \$39.96 \text{ (correct)}$$

$$105 \times \$0.97 = \$101.85 \text{ (correct)}$$

$$23 \times \$58.45 = \$1,344.35 \text{ (correct)}$$

$$25 \times \$65.75 = \$1,643.75 \neq 1,645.75 \text{ showed in the invoice (incorrect)}$$

$$25 \times \$19.97 = \$499.25 \text{ (correct)}$$

Brian found an error in one item. He adds up the correct amounts:

$$\text{Subtotal} = \$39.96 + \$101.85 + \$1,344.35 + \$1,643.75 + \$499.25 = \$3,629.16$$

The subtotal should be \$3,629.16.

# LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

3.1 As the maintenance supervisor at the Paradise Alley Casino, you must check all the invoices you receive. Check the invoice below:

**To:** Paradise Alley Casino  
**From:** John Clothing  
**Delivered to:** Paradise Alley Casino  
**Attention:** Vivian Smith

**Purchase Order: Paradise Alley 2556 Invoice No. 38967I Date: Jan 2/06**

| Qty Ordered | Item/Number      | Unit Price | Net Price         |
|-------------|------------------|------------|-------------------|
| 20          | Shirts           | \$25.95    | \$519.00          |
| 20          | Pants            | \$65.95    | \$1,319.00        |
| 25          | Blazers          | \$70.50    | \$1,792.50        |
| 20          | Vests            | \$20.75    | \$415.00          |
| 10          | Parkas           | \$250.00   | \$2,500.00        |
| 50          | Hats             | \$10.95    | \$547.50          |
| 50          | Scarfs           | \$10.95    | \$547.50          |
|             | <b>Subtotal:</b> |            | <b>\$7,640.50</b> |

## Skill 4: Count Coins

TELL  
ME



Many casino workers are responsible for counting coins.

To find the value of a bag of coins:

- **Multiply** the **value** of **one coin** by the **number of coins** you have.
- **Count** the **value** of coins **individually** or in **rolls** or **bags**.

TEACHING  
TIPS 3



SHOW  
ME



Here are the values of bags of coins:

Coins come in bags of 1000.

|                   |                         |              |
|-------------------|-------------------------|--------------|
| A bag of quarters | = $\$0.25 \times 1,000$ | = \$250.00   |
| A bag of loonies  | = $\$1.00 \times 1,000$ | = \$1,000.00 |
| A bag of toonies  | = $\$2.00 \times 1,000$ | = \$2,000.00 |

Here are the values of rolls of coins:

Coins come in rolls of different sizes.

|          |                             |
|----------|-----------------------------|
| Pennies  | 1 roll = 50 coins = \$0.50  |
| Nickels  | 1 roll = 40 coins = \$2.00  |
| Dimes    | 1 roll = 50 coins = \$5.00  |
| Quarters | 1 roll = 40 coins = \$10.00 |
| Loonies  | 1 roll = 25 coins = \$25.00 |
| Toonies  | 1 roll = 25 coins = \$50.00 |



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

4.1 Cashiers are responsible for keeping strict control over the cash at their stations. At the beginning of her shift, Carol counts out the following coins and records the totals on her tally sheet. What should she record on her sheet? (assume same values as in Show Me)

- 2 bags of quarters = \_\_\_\_\_
- 4 bags of loonies = \_\_\_\_\_
- 6 bags of toonies = \_\_\_\_\_
- 39 loose quarters = \_\_\_\_\_
- 6 rolls of quarters = \_\_\_\_\_
- 17 loose loonies = \_\_\_\_\_
- 12 rolls of loonies = \_\_\_\_\_
- 13 loose toonies = \_\_\_\_\_
- Total = \_\_\_\_\_

**Skill 5:**

**Count Large Amounts of Cash**



A casino worker may have to count and record large amounts of cash.

To count and record a large amount of cash:

- **Count** the **total cash** in **bills**. **Multiply** the value of a bill by the number of bills of the same value. Do this for each type of bill.
- **Count** the **value** of **coins**. **Multiply** the value of one coin by the number of coins of the same value. Do this for each type of coin.
- **Add** the totals of **coins** and **bills**.

# SHOW ME



Frank is responsible for transferring the following cash to the vault.

The table below shows how he calculated the total cash in the bundles, and then added up the final total.

|  |                                 |             |
|--|---------------------------------|-------------|
| 9 \$100 bills                              | $9 \times \$100$                | \$900.00    |
| 2 bundles of \$50's @ 50 bills per bundle  | $(2 \times 50) \times \$50$     | \$5,000.00  |
| 8 bundles of \$20's @ 50 bills per bundle  | $(8 \times 50) \times \$20$     | \$8,000.00  |
| 12 bundles of \$10's @ 50 bills per bundle | $(12 \times 50) \times \$10$    | \$6,000.00  |
| 10 bundles of \$5's @ 100 bills per bundle | $(10 \times 100) \times \$5$    | \$5,000.00  |
| 2 bags of Toonies @ 500 coins per bag      | $(2 \times 500) \times \$2$     | \$2,000.00  |
| 3 bags of loonies @ 500 coins per bag      | $(3 \times 500) \times \$1$     | \$1,500.00  |
| 10 bags of quarters @ 500 coins per bag    | $(10 \times 500) \times \$0.25$ | \$1,250.00  |
| Total cash                                 |                                 | \$29,650.00 |

# LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

5.1 Calculate the total cash in bundles below and then calculate the final total:

- 2 bundles of \$100's @ 50 bills per bundle
- 3 bundles of \$50's @ 50 bills per bundle
- 6 bundles of \$20's @ 50 bills per bundle
- 14 bundles of \$10's @ 50 bills per bundle
- 7 bundles of \$5's @ 100 bills per bundle
- 3 bags of toonies @ 500 coins per bag
- 3 rolls of loonies @ 20 coins per roll
- 4 bags of quarters @ 500 coins per bag

## Skill 6: Calculate Cash Value of Chips

TELL  
ME



Casino workers must know the values of different coloured chips.

The chips and their values are recorded below:

| Color of Chip | Value of one Chip | Value of full stack (20 chips) | Size & value of cut stack |
|---------------|-------------------|--------------------------------|---------------------------|
| Orange        | \$0.50            | \$10.00                        | 2 chips = \$1.00          |
| White         | \$1.00            | \$20.00                        | 5 chips = \$5.00          |
| Red           | \$5.00            | \$100.00                       | 5 chips = \$25.00         |
| Green         | \$25.00           | \$500.00                       | 4 chips = \$100.00        |
| Black         | \$100.00          | \$2,000.00                     | 5 chips = \$500.00        |
| Purple        | \$500.00          | \$10,000.00                    | 5 chips = \$2,500.00      |
| Yellow        | \$1,000.00        | \$20,000.00                    | 5 chips = \$5,000.00      |

To calculate the value of chips:

1. Pay attention to the **size and value of the cut stack** for each color.
2. **Divide** the number of chips by the size of the cut stack.
3. **Multiply** the value of the cut stack by the result in step 2.

SHOW  
ME



To find the value of 16 orange chips, do the following:

$$\begin{aligned}2 \text{ orange chips} &= \$1.00 \\16:2 &= 8 \text{ groups of 2 orange chips} \\16 \text{ orange chips} &= 8 \times \$1 = \$8\end{aligned}$$

To find the value of 10 green chips, do the following:

$$\begin{aligned}4 \text{ green chips} &= \$100 \\10:4 &= 2.5 \text{ groups of 4 green chips} \\10 \text{ green chips} &= \$100 \times 2.5 = \$250\end{aligned}$$



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

6.1 Calculate the values of each of the following:

- a) 17 green chips
- b) 25 orange chips
- c) 33 white chips
- d) 2 black chips
- e) 6 yellow chips
- f) 28 red chips
- g) 17 orange chips
- h) 95 red chips
- i) 26 white chips
- j) 35 green chips

6.2 Casino cashiers must be able to do math in their heads quickly and accurately. Calculate the following values using mental math. Check your answers with a calculator.

- a) 17 orange chips and 7 white chips
- b) 10 red chips and 3 green chips
- c) 10 orange chips, 5 white chips, 3 green chips
- d) 6 red chips, 4 green chips, 1 black chip
- e) 25 orange chips, 12 white chips
- f) 3 white chips, 4 green chips, and 1 black chip
- g) 6 orange chips, 5 white chips, 3 red chips, 2 green chips, 1 black chip
- h) 10 orange chips, 9 white chips, 2 green chips
- i) 3 orange chips, 2 red chips, 1 black chip
- j) 14 white chips, 3 green chips, 2 purple chips

## Skill 7:

# Convert US Currency to Canadian Currency

TELL  
ME



Casino workers who handle money must know how to convert US funds to Canadian (CDN) funds.

To convert US funds to Canadian funds:

**Divide total US dollars by the current US value of one Canadian dollar. Round off to two decimal places (cents).**

Or

**Multiply the US funds by the Canadian value of one US dollar. Round off to two decimal places (cents).**

SHOW  
ME



The value of the Canadian dollar is \$0.73 US. A guest has \$300.00 US and would like to convert it to Canadian funds.

|          |   |                           |   |                   |
|----------|---|---------------------------|---|-------------------|
| US funds | ÷ | US value of<br>CDN Dollar | = | Canadian<br>Funds |
| \$300    | ÷ | \$0.73                    | = | \$410.958         |

Rounded off to the nearest cent = \$410.96.

The US dollar is worth \$1.35 CDN. A guest has \$500.00 US and would like to convert it to Canadian funds.

|          |   |                           |   |                   |
|----------|---|---------------------------|---|-------------------|
| US funds | × | CDN value<br>of US dollar | = | Canadian<br>Funds |
| \$500.00 | × | \$1.35                    | = | \$675.00          |

The guest should receive exactly \$675.00. Rounding off is not necessary.

## SOMETHING TO CONSIDER

When calculating change for guests paying in US funds, follow a two-step process:

1. Convert US funds to Canadian funds.
2. Complete the transaction using Canadian funds.

# LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 7.1 A guest has a bill of \$38.30. She pays with a US \$50.00 bill. How much change should she receive? (Assume the exchange rate is \$1 US = \$1.25 CDN.)
- 7.2 A guest wants to pay for dinner for him and five people who are dining with him. The total bill is \$315.00. He pays with \$300.00 US. How much change should he receive? (Assume the exchange rate is \$1US = \$1.30 CDN.)
- 7.3 One dollar Canadian is trading at \$0.78 US. How much Canadian money should you give a guest in exchange for \$150.00 US?
- 7.4 The current rate of exchange for US currency is \$1.23 CDN. How much Canadian money should you give a guest in exchange for \$100.00 US?
- 7.5 A guest wants to pay for his bill for dinner and drinks with \$100.00 in US funds. One dollar Canadian is worth \$1.22 US. What is the first thing that you do?
- 7.6 A guest has a bill of \$25.50 CDN. He pays with a US \$50.00 bill. How much change does he receive? (Assume the exchange rate is \$1 US = \$1.25 CDN.)
- 7.7 A guest wants to pay for dinner for a party of 8. The total bill is \$510.00 CDN. He pays with US \$500.00. How much change should he receive? (Assume the exchange rate is \$1 US = \$1.25 CDN.)
- 7.8 One dollar Canadian is trading for \$0.81 cents US. How much Canadian money should you give a guest in exchange for \$240.00 US?  
Convert Canadian Currency to US Currency

## Skill 8:

# Convert Canadian Currency to US Currency

TELL  
ME



To convert Canadian funds to US:

**Divide total amount of Canadian currency** by the **Canadian value** of the **US dollar**.

**Round off to two decimal places** (cents).

Or

**Multiply the total Canadian funds** by the **US value** of the **Canadian dollar**.

**Round off to two decimal places** (cents).

SHOW  
ME



If the Canadian dollar is trading at \$0.80 US, one US dollar is worth \$1.25 CDN. A guest has \$640.00 CDN and would like to convert it to US funds.

|           |   |                           |   |             |
|-----------|---|---------------------------|---|-------------|
| CDN funds | ÷ | CDN value of<br>US dollar | = | US<br>Funds |
| \$640.00  | ÷ | \$1.25                    | = | \$512.00    |

The Canadian dollar is trading at \$0.80 US. A guest has \$980.00 CDN and would like to convert it to US funds.

|           |   |                           |   |             |
|-----------|---|---------------------------|---|-------------|
| CDN funds | x | US value of<br>CDN dollar | = | US<br>Funds |
| \$980.00  | x | \$0.80                    | = | \$784.00    |

Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

8.1 The Canadian dollar is trading at \$0.81 US. How much is one US dollar worth in Canadian funds?

8.2 The US dollar is worth \$1.33 CDN. How much is one Canadian dollar worth in US funds?

8.3 Fill in the blanks in the chart below.

| A. | Canadian Funds | US Funds |
|----|----------------|----------|
| 1. | \$1.00         | \$0.85   |
| 2. | \$65.00        |          |
| 3. | \$270.00       |          |
| 4. | \$1,200.00     |          |
| 5. | \$845.00       |          |
| 6. | \$555.00       |          |
| 7. | \$920.00       |          |
| 8. | \$123.00       |          |
| 9. | \$482.00       |          |
| B. | Canadian Funds | US Funds |
| 1. | \$1.41         | \$1.00   |
| 2. | \$97.00        |          |
| 3. | \$388.00       |          |
| 4. | \$923.00       |          |
| 5. | \$1,000.00     |          |
| 6. | \$466.00       |          |
| 7. | \$348.00       |          |
| 8. | \$975.00       |          |
| 9. | \$2,589.00     |          |

8.4 If the current rate of exchange for US currency is \$1.22 CDN, how much Canadian money should a guest receive in exchange for \$325.00 US?

8.5 If a guest wants to pay for his bill with \$200.00 in American funds, how much Canadian money do you give him? (Assume the exchange rate is \$1.20 CDN on the US dollar.)



Compare your answers for Let Me Try activities below. If you have less than half the answers correct, review the material and try the activities again.

## Cash on Hand

### Skill 1: Control Cash

1.1 Pierre's float is: \$2,205.00

|                     |              |
|---------------------|--------------|
| $45 \times \$5.00$  | = \$225.00   |
| $37 \times \$10.00$ | = \$370.00   |
| $48 \times \$20.00$ | = \$960.00   |
| $13 \times \$50.00$ | = \$650.00   |
| Total               | = \$2,205.00 |

1.2 Rebecca's float is: \$19,525.00

|                      |               |
|----------------------|---------------|
| $97 \times \$5.00$   | = \$485.00    |
| $46 \times \$10.00$  | = \$460.00    |
| $239 \times \$20.00$ | = \$4,780.00  |
| $88 \times \$50.00$  | = \$4,400.00  |
| $64 \times \$100.00$ | = \$6,400.00  |
| Total                | = \$19,525.00 |

### Skill 2: Calculate Tips

2.1

- Maria had \$68.55 in tips.
- Maria's cash on hand was: \$30 (vouchers) + \$205 (cash) = \$235 cash on hand.

### Skill 3: Check Calculations Done by Someone Else

3.1 The amount for the blazers is incorrect. It should be \$1,762.50. The correct subtotal is \$7,610.50.

|             |   |   |
|-------------|---|---|
| 20 × 25.95  | = | \$519.00                                      |
| 20 × 65.95  | = | \$1,319.00                                    |
| 25 × 70.50  | = | \$1,792.50 (incorrect). Should be \$1,762.50. |
| 20 × 20.75  | = | \$415.00                                      |
| 10 × 250.00 | = | \$2,500.00                                    |
| 50 × 10.95  | = | \$547.50                                      |
| 50 × 10.95  | = | \$547.50                                      |
| Subtotal    | = | \$7,640.50 (incorrect). Should be \$7,610.50. |

### Skill 4: Count Coins

4.1

|                     |   |             |
|---------------------|---|-------------|
| 2 bags of quarters  | = | \$500.00    |
| 4 bags of loonies   | = | \$4,000.00  |
| 6 bags of toonies   | = | \$12,000.00 |
| 39 loose quarters   | = | \$9.75      |
| 6 rolls of quarters | = | \$60.00     |
| 17 loose loonies    | = | \$17.00     |
| 12 rolls of loonies | = | \$300.00    |
| 13 loose toonies    | = | \$26.00     |
| Total               | = | \$16,912.75 |

### Skill 5: Count Large Amounts of Cash

5.1

|  |   |             |
|--|---|-------------|
| 2 bundles of \$100's @ 50 bills per bundle | = | \$10,000.00 |
| 3 bundles of \$50's @ 50 bills per bundle  | = | \$7,500.00  |
| 6 bundles of \$20's @ 50 bills per bundle  | = | \$6,000.00  |
| 14 bundles of \$10's @ 50 bills per bundle | = | \$7,000.00  |
| 7 bundles of \$5's @ 100 bills per bundle  | = | \$3,500.00  |
| 3 bags of toonies @ 500 coins per bag      | = | \$3,000.00  |
| 3 rolls of loonies @ 25 coins per roll     | = | \$75.00     |
| 4 bags of quarters @ 500 coins per bag     | = | \$500.00    |
| Total:                                     |   | \$37,575.00 |

## Skill 6: Calculate Cash Value of Chips

6.1

- a) 17 green chips = \$425.00
- b) 25 orange chips = \$12.50
- c) 33 white chips = \$33.00
- d) 2 black chips = \$200.00
- e) 6 yellow chips = \$6,000.00
- f) 28 red chips = \$140.00
- g) 17 orange chips = \$8.50
- h) 95 red chips = \$475.00
- i) 26 white chips = \$26.00
- j) 35 green chips = \$875.00

6.2

- a) \$15.50
- b) \$125.00
- c) \$85.00
- d) \$230.00
- e) \$24.50
- f) \$203.00
- g) \$173.00
- h) \$64.00
- i) \$111.50
- j) \$1,089.00

## Skill 7: Convert US Currency to Canadian Currency

7.1  $\$50 \text{ US} \times 1.25 = \$62.50 \text{ CDN}$ .  $\$62.50 - \$38.30 = \$24.20$

7.2  $\$300 \text{ US} \times 1.30 = \$390 \text{ CDN}$ .  $\$390 - \$315 = \$75.00$

7.3  $\$150.00 \text{ US} \div 0.78 = \$192.31 \text{ CDN}$

7.4  $\$123.00 \text{ CDN}$

7.5 Exchange his US currency for Canadian at the current rate of exchange.

7.6  $\$50 \text{ US} = \$62.50 \text{ CDN}$ .  $\$62.50 - \$25.50 = \$37.00 \text{ change}$

7.7  $\$500.00 \text{ US} \times 1.25 = \$625.00 \text{ CDN}$ .  $\$625.00 - \$510.00 = \$115.00 \text{ CDN}$

7.8  $\$240.00 \text{ US} \div 0.81 = \$296.30 \text{ CDN}$

## Skill 8: Convert Canadian Currency to US Currency

8.1 \$1.2346

8.2 \$0.75188

8.3 Answers are shown in bold print in the table below.

| A. | Canadian Funds | US Funds   |
|----|----------------|------------|
| 1. | \$1.00         | \$0.85     |
| 2. | \$65.00        | \$55.25    |
| 3. | \$270.00       | \$229.50   |
| 4. | \$1,200.00     | \$1,020.00 |
| 5. | \$845.00       | \$718.25   |
| 6. | \$555.00       | \$471.75   |
| 7. | \$920.00       | \$782.00   |
| 8. | \$123.00       | \$104.55   |
| 9. | \$482.00       | \$409.70   |
| B. | Canadian Funds | US Funds   |
| 1. | \$1.41         | \$1.00     |
| 2. | \$97.00        | \$68.79    |
| 3. | \$388.00       | \$275.18   |
| 4. | \$923.00       | \$654.61   |
| 5. | \$1,000.00     | \$709.22   |
| 6. | \$466.00       | \$330.50   |
| 7. | \$348.00       | \$246.81   |
| 8. | \$975.00       | \$691.47   |
| 9. | \$2,589.00     | \$1,836.17 |

8.4  $\$325.00 \text{ US} \times \$1.22 = \$396.50 \text{ CDN}$

8.5  $\$200.00 \text{ US} \times \$1.20 = \$240.00 \text{ CDN}$

## Foundation Section

# Decimals: Basics, Calculating Decimal Hours and Pay

$$\frac{45 \text{ minutes worked}}{60 \text{ minutes per hour}} = 45 \div 60$$



# Teaching Tips

One of the common mistakes learners make working with decimals is not estimating beforehand the approximate size of the answer. It is important to have a general sense of whether or not an answer is reasonable. They should know, for example, that when you divide a number by a number lesser than 1, the answer will be greater than the dividend:

$$3 \div 0.1 = 30$$

30 is greater than 3. If learners know that the answer must be greater than 3, they will recognize they have a wrong answer if they get less than 3.

To avoid this kind of mistake, you can try this type of exercise:

- Ask them what happens when you multiply a number by 0.89, by 0.2 or by 1.003. Is each answer shorter or larger than the original number? Why?

$$3 \times .89 = 2.67$$

$$3 \times 0.2 = 0.6$$

$$3 \times 1.003 = 3.009$$

# Introduction

Decimals are used for writing fractional numbers, or numbers that are not whole. The decimal system lets us write numbers of all types and sizes, using the decimal point.

Understanding decimals is very important for casino workers. They use decimals when they count money. They also use decimals to calculate pay for hours worked.

In this section, you will learn how to:

- Read Decimals
- Add, Subtract, Multiply and Divide with Decimals
- Convert Hour and Minutes between Hours and Tenths
- Calculate the Total Cost of Employees according to their Wages and Worked Hours

## Some jobs that need Decimal skills

Animatronics Operator  
Bank Supervisor  
Banquet Supervisor  
Bartender  
Bingo Volunteer Coordinator  
Bingo/Keno Cashier  
Bingo/Keno/Video (BKV) Attendant  
(Caller / Checker)  
BVK Supervisor  
Casino Bank Cashier  
Cook  
Chef  
Department Manager  
Dining Room Supervisor  
Facility Technician  
Facilities Supervisory  
Guest Services Representative  
Guest Services Supervisor  
Hostess/Host  
Housekeeping Attendant  
Housekeeping Supervisor  
Investigative Security Officer  
Maintenance Technician  
Retail Cashier  
Retail Supervisory  
Security Officer  
Security Supervisor  
Senior Cashier  
Senior Clerk Typist  
Server  
Shuttle Bus Driver  
Slot Attendant  
Slot Floor Supervisor  
Surveillance Technician  
Switchboard Operator  
Table Games Inspector  
Technical Support Supervisor  
Uniforms Technician  
Uniforms Supervisor  
Valet Attendant  
Warehouse Clerk  
Warehouse Supervisor

$$\frac{45 \text{ minutes worked}}{60 \text{ minutes per hour}} = 45 \div 60$$

## Skill 1: Read Decimals

TELL  
ME



The presence of a decimal point tells you that a number is a decimal. The number of places in the decimal tells you how much it is worth. As you move to the right from the decimal point, each number place is divided by 10. For example:

The first place to the right of the decimal point is the **tenths** place.

$$0.1 = \text{tenths}$$

The second place to the right of the decimal point is the **hundredths** place.

$$0.01 = \text{hundredths}$$

The third place to the right of the decimal point is the **thousandths** place.

$$0.001 = \text{thousandths}$$

Zeros placed in front of the number keep the decimals in their right places. These zeros ensure that the numbers are placed in the correct column. For example:

$$4 / 10 = 4 \text{ tenths} = 0.4$$

$$6 / 100 = 6 \text{ hundredths} = 0.06$$

$$7 / 1000 = 7 \text{ thousandths} = 0.007$$

$$48 / 1000 = 48 \text{ thousandths} = 0.048$$

A **mixed decimal** is a **whole number** and a **decimal**. For example:

In 32.45, 32 is the whole number and 0.45 is the decimal.

SHOW  
ME



We read the decimal number 24.56 as “twenty four and fifty-six hundredths”.

### SOMETHING TO CONSIDER

We would usually read this number out loud as “twenty-four point five six.”

We read 0.048 as “forty-eight thousandths”.

We read 321.7 as “three hundred twenty-one and seven tenths”.

### SOMETHING TO CONSIDER

Remember to read the decimal point as “and”. See in the following two numbers what a difference that makes!

0.647     Six hundred forty-seven thousandths

600.047     Six hundred and forty-seven thousandths

Now it’s your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

1.1 Read the following numbers:

- a) 43.97
- b) 104.08
- c) 0.78
- d) 205.025

## Skill 2: Add Decimal Numbers

TELL  
ME



To **add** decimals numbers:

1. Place the numbers in a **vertical** column and **align** the **decimal points**.

2. **Add** each column of digits, starting on the right and working left. If the sum of a column is more than ten, **“carry” digits** to the next column on the left, just as you would in any addition.
3. Place the **decimal** point in the answer **directly below the decimal points in the terms**.

**SHOW  
ME**



$$24.78 + 5.01 + 123.6 =$$

Write the numbers in a vertical column and align the decimal points.

$$\begin{array}{r} 24.78 \\ + 5.01 \\ 123.6 \\ \hline \end{array}$$

Add each column, starting from the right to the left, carrying digits when needed.

$$\begin{array}{r} \phantom{1} \phantom{1} \\ 24.78 \\ + 5.01 \\ 123.6 \\ \hline 153.39 \end{array}$$

Place the decimal point in the answer directly under the decimal points in the terms you are adding.

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

2.1 Calculate the following additions:

|                 |                  |                |                |
|-----------------|------------------|----------------|----------------|
| a) 12.343       | b) 76.2          | c) 96.1275     | d) 52.252      |
| 10.12           | 11.111           | 45.9           | 87.8           |
| + <u>14.323</u> | + <u>45.9875</u> | + <u>0.009</u> | + <u>67.98</u> |

- 2.2 Mike checked the odometer on the forklift. Last week it read 45,789.86 kilometres and it travelled 87.5 kilometres during the week. What is the total number of kilometres that the odometer reads now?
- 2.3 The supervisor of the uniform department spent the following on supplies: \$21.32 on needles for the sewing machines, and \$56.89 on industrial thread. What was the total amount of money spent?

## Skill 3: Subtract Decimal Numbers

TELL  
ME



To **subtract** decimal numbers:

1. Place the numbers in a **vertical** column and **align** the **decimal points**.
2. **Subtract** each column, starting on the right and working left. If the digit being subtracted in a column is larger than the digit above it, “**borrow**” a **digit** from the next column to the left.
3. Place the **decimal** point in the answer **directly below the decimal points in the terms**.

SHOW  
ME



To subtract these decimal numbers:

$$345.36 - 3.4 =$$

1. Place the numbers in a vertical column and align decimal points. You can add zeroes to the right of the decimal point, to make it easier to align the columns.

$$\begin{array}{r} 345.36 \\ - 3.40 \\ \hline \end{array}$$

2. Subtract each column, starting on right and working to the left. “Borrow” digits when needed.

$$\begin{array}{r} \phantom{0}1 \\ 345.36 \\ - 3.40 \\ \hline 341.96 \end{array}$$

3. Place the decimal point in the answer directly below the decimal points in the terms.

$$\begin{array}{r} 345.36 \\ - 3.40 \\ \hline 341.96 \end{array}$$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 3.1 Calculate the following subtractions:

|             |           |              |             |
|-------------|-----------|--------------|-------------|
| a) $40.104$ | b) $26.9$ | c) $87.9875$ | d) $43.034$ |
| $- 27.49$   | $- 1.989$ | $- 27.89$    | $- 24.89$   |

- 3.2 The bill for a guest's dinner was \$25.56. The guest gave the server \$32.81. How much change was given to the guest?

- 3.3 Shirley wanted to spend \$25.00 on a retirement gift for a colleague. The item was on sale for \$18.79. How much did she save?

## Skill 4: Multiply Decimal Numbers

TEACHING  
TIPS 1



TELL  
ME



To **multiply** decimal numbers:

1. Line up the numbers on the right.
2. **Multiply** each digit in the top number by each digit in the bottom number (like whole numbers).
3. **Add** the products.
4. Mark off decimal places equal to the sum of the decimal places in the numbers being multiplied. **Zero** can be used as a **place holder** if necessary.



To multiply decimal numbers:

$$4.84 \times 4.3 =$$

1. Line up the numbers to multiply.

$$\begin{array}{r} 4.84 \\ \underline{4.3} \end{array}$$

2. Multiply each digit in the top number by each digit in the bottom number (like whole numbers).

$$\begin{array}{r} 4.84 \\ \times 4.3 \\ \hline 1452 \\ + 19360 \end{array}$$

3. Add the products.

$$\begin{array}{r} 4.84 \\ \times 4.3 \\ \hline 1452 \\ + 19360 \\ \hline 20.812 \end{array}$$

4. Count off the number of decimal places in the two numbers you are multiplying and add those numbers.

Count off 3 decimal places from the RIGHT in the answer and place the decimal there.

|  |   |
|--|---|
| $\begin{array}{r} 4.84 \\ \times 4.3 \\ \hline 1452 \\ + 19360 \\ \hline 20.812 \end{array}$ | Two decimal places<br>One decimal place<br><br>Three decimal places |
|--|---|

Zero can be used as a place holder if necessary. For example:

0.42      Two decimal places

$\begin{array}{r} \times 1.6 \\ 252 \end{array}$       One decimal place

$\begin{array}{r} \underline{42} \\ 0.672 \end{array}$       Three decimal places

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

4.1 Calculate the following multiplications:

a)  $\begin{array}{r} 35.3 \\ \times 23.3 \end{array}$       b)  $\begin{array}{r} 69.45 \\ \times 1.2 \end{array}$       c)  $\begin{array}{r} 0.256 \\ \times 0.3 \end{array}$       d)  $\begin{array}{r} 0.267 \\ \times 0.32 \end{array}$

4.2 Derek needed to buy photocopying paper. One box of paper cost \$35.65. He bought 5 boxes. How much money did he spend?

4.3 Kelly needed to buy Javex for the housekeeping department. One container costs \$1.07 and she ordered 50 containers. How much money did she spend?

## Skill 5: Divide Decimal Numbers

TELL  
ME



1. If the **divisor** is **not** a **whole number**, move **decimal point to right** to make it a whole number and **move decimal point in dividend** the same number of places.
2. **Divide** as usual. Keep dividing until the answer terminates or repeats.
3. Put the **decimal** point directly **above** the **decimal** point in the **dividend**.
4. Check your answer. **Multiply the quotient by the divisor\***. It should equal the dividend.

\* Note: In  $32 \div 8 = 4$ , 32 is the dividend, 8 is the divisor and 4 is the quotient.



Find this quotient:

To divide 16.9 by 6.5:

1. First show the division like this:

$$6.5 \overline{)16.9}$$

Next, move the decimal point one place to the right. This makes the divisor a whole number. Move the decimal point in the dividend one place to the right.

$$65 \overline{)169.}$$

2. Divide as you would divide with whole numbers. The number 65 goes into 169 two times, with 39 left over.

$$\begin{array}{r} 2 \\ 65 \overline{)169.} \end{array}$$

$$\begin{array}{r} - 130 \\ \hline 39 \end{array}$$

To continue dividing, add a zero to the right of the decimal point in the dividend. Then bring down the zero, and add it to the end of 39, making it 390.

$$\begin{array}{r} 2 \\ 65 \overline{)169.0} \end{array}$$

$$\begin{array}{r} - 130 \\ \hline 390 \end{array}$$

3. 65 goes into 390 six times. We write a 6 above the zero in the quotient and put the decimal point just above the decimal point in the dividend.

$$\begin{array}{r} 2.6 \\ 65 \overline{)169.0} \end{array}$$

$$\begin{array}{r} - 130 \\ \hline 390 \end{array}$$

$$\begin{array}{r} - 390 \\ \hline 0 \end{array}$$

4. To check our answer, we multiply the quotient by the divisor and make sure it equals the dividend.

$$\begin{array}{r} 2.6 \\ \times 6.5 \\ \hline 130 \\ + 156 \\ \hline 16.90 \end{array}$$

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

5.1 Calculate the following divisions:

a)  $9\overline{)5.49}$     b)  $7\overline{)63.7}$     c)  $4\overline{)2.48}$     d)  $8\overline{)7.28}$

e)  $6\overline{)17.675}$     f)  $5\overline{)13.678}$     g)  $3\overline{)0.7346}$     h)  $4\overline{)0.815}$

5.2 When Doug drove around the U.S. looking at different casinos, he travelled 603.258 kilometres. Doug used 34.67 litres of gas. How many kilometres per litre did Doug get on his travels?

5.3 Five metres of upholstery fabric costs \$138.90. How much does 1 metre cost?

5.4 Six bottles of beer costs \$16.50. How much does 1 bottle of beer cost?

## Skill 6:

# Convert a Fraction to a Decimal and Round It Off

TELL  
ME



To **convert** a **fraction** to a **decimal**, perform the division indicated by the fraction bar.

Note:  $\frac{3}{5}$  ← Fraction bar means “divided by”

**To round off decimals:**

1. Find the place value you want (the “rounding digit”). Look at the digit just to the right of it.
2. If that digit is less than 5, do not change the rounding digit. Drop all digits to the right of it.
3. If that digit is greater than or equal to 5, add 1 to the rounding digit. Drop all digits to the right of it.

SHOW  
ME



The following examples show how to convert to a decimal and round off the answer to the nearest tenth.

1. Divide 7:25                       $\frac{7}{25} = 7 \div 25 = 0.28$

Find the rounding digit. This is the “2”.

Look one digit to the right, at the digit in the hundredths place which is “8”. 8 is more than 5, so this number needs to be rounded up. Add 1 to the rounding digit and drop the digits to the right of 2. This gives 0.3.

2. Divide 19:80                       $\frac{19}{80} = 19 \div 80 = 0.2375$

Find the rounding digit. This is the “2”.

Look one digit to the right of 2. It is 3. The 3 is less than 5, so don’t change the rounding digit and drop all digits to the right of it. This leaves you with 0.2.

## SOMETHING TO CONSIDER

Use estimating to help you check the placement of the decimal point. You could round 37.7 to 40 and 2.8 to 3. It's easy to multiply  $3 \times 40$  so you know your answer should be close to 120.

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

6.1 Round off the following decimal numbers as indicated:

- a) 2.345 to hundredths
- b) 4.58 to tenths
- c) 53.898 to hundredths
- d) 20.18 to tenths
- e) 35.5588 to tenths
- f) 80.94 to tenths
- g) 45.58 to tenths
- h) 32.98 to tenths
- i) 25.95 to tenths
- j) 50.301 to hundredths

## Skill 7:

## Convert Hours and Minutes to Hours and Tenths

TELL  
ME



To **calculate tenths** of hours:

1. Write the **number of minutes worked as a fraction over 60**.
2. **Perform the division. Round off** your answer to tenths.

**SHOW  
ME**



$\frac{45 \text{ minutes worked}}{60 \text{ minutes per hour}} = 45 \div 60 = 0.75 \text{ hours or } 0.8 \text{ hour}$

$\frac{25 \text{ minutes worked}}{60 \text{ minutes per hour}} = 25 \div 60 = 0.41666 \text{ or } 0.4 \text{ hour}$

Remember to include the whole number of hours as part of your solution.

6 hours and 10 minutes worked =  $6 \frac{10}{60} = 6.16 \text{ or } 6.2 \text{ hours}$

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

7.1 Convert the following information from hours and minutes to hours and tenths.

- a) 10 minutes
- b) 40 minutes
- c) 15 minutes
- d) 16 hours and 39 minutes
- e) 12 hours and 23 minutes
- f) 10 hours and 12 minutes
- g) 18 hours and 5 minutes
- h) 24 hours and 20 minutes
- i) 29 hours and 30 minutes
- j) 8 hours and 35 minutes

# Challenge My Skills

Challenge all your skills working with decimals by using these multi-skill practice activities. See Check My Answers at the end of the section for the correct answers.

1. Murray's work schedule for the pay period February 1 – 8, 2005 is shown below. Round your answer to the nearest quarter hour.

| Date      | Time In    | Time Out   | Total Hours |
|-----------|------------|------------|-------------|
| Feb. 1/05 | 6:30 a.m.  | 11:30 a.m. |             |
|           | 12:15 p.m. | 3:01 p.m.  |             |
| Feb. 2/05 | 8:28 a.m.  | 12:30 p.m. |             |
| Feb. 5/05 | 6:20 a.m.  | 11:25 a.m. |             |
|           | 12:15 p.m. | 3:05 p.m.  |             |
| Feb. 6/05 | 6:28 a.m.  | 11:33 a.m. |             |
|           | 12:16 p.m. | 3:03 p.m.  |             |
| Feb. 7/05 | 8:21 a.m.  | 12:25 p.m. |             |
| Feb. 8/05 | 8:28 a.m.  | 12:45 p.m. |             |

- Calculate the hours worked each day by this employee.
  - Calculate the total hours worked for this pay period.
  - Murray is a part-time grounds employee. His wage is \$11.50 per hour. What is his gross pay for this pay period?
2. In the accounting department there are eight clerical employees: 1 receptionist, 3 clerks (Level I), 2 clerks (Level II) and 2 clerks (Level IV). The clerical staff are paid hourly wages. The wage scale and work schedules are summarized below for 1 week in April, 2005.

| Job Title    | Regular Hours     | Wage/hour        | Total Gross Pay/Employee |
|--------------|-------------------|------------------|--------------------------|
| Receptionist | 40 hours per week | \$11.25 per hour | \$450.00                 |
| Clerk I      | 35 hours per week | \$9.55 per hour  | \$334.25                 |
| Clerk II     | 35 hours per week | \$10.15 per hour | \$355.25                 |
| Clerk IV     | 40 hours per week | \$15.75 per hour | \$630.00                 |

- a) What is the total cost of Level I clerks per week?
  - b) What is the total cost of Level II clerks per week?
  - c) What is the total cost of Level IV clerks per week?
  - d) What is the total amount that is paid to clerical staff per week?
  - e) A Clerk I is sick for 3 days. The cost of a temporary replacement is \$27.00 per hour. Overtime pay for regular staff is double time. Which option would be the most cost-efficient of the ones listed below:
    - i Hire a temporary worker for 2 of the 3 days' absence. (assume the temporary employee works 15 hours.)
    - ii Ask the other 2 Clerks (Level I) to each work 4 extra hours on Saturday.
    - iii Ask a Clerk IV to work 6 hours on Saturday to bring all the work up to date.
3. Liz is buying some office supplies. She took \$23.45 from petty cash. She spent \$4.56 on pencils, \$3.76 on paper clips and \$8.78 on paper. There were also sales taxes of \$2.39. How much did Liz spend and how much did she return to the petty cash box?
4. Tony's pay is \$345.89 per week. Each week \$65.89 is deducted for taxes and \$12.67 for insurance. What is Tony's pay on a weekly basis after the deductions are calculated?
5. This year John pays \$350.75 each month for rent. Next year his rent will go up \$17.50 per month. What will his monthly rent be as a result of this increase? How much more will he pay over 12 months?



**C**ompare your answers for Let Me Try and Challenge My Skills activities below. If you have less than half the answers correct, review the material and try the activities again.

## Skill 1: Read Decimals

1.1

- a) Forty-three and ninety-seven hundredths
- b) One hundred and four and eight hundredths
- c) Seventy-eight hundredths
- d) Two hundred and five and twenty-five thousandths

## Skill 2: Add Decimal Numbers

2.1

- a) 36.786
- b) 133.2985
- c) 142.0365
- d) 208.032

2.2 45,877.36 kilometres

2.3 \$78.21

## Skill 3: Subtract Decimal Numbers

3.1

- a) 12.614
- b) 24.911
- c) 60.0975
- d) 18.144

3.2 \$7.25

3.3 \$6.21

## Skill 4: Multiply Decimal Numbers

4.1

- a) 822.49
- b) 83.34
- c) 0.0768
- d) 0.08544

4.2 \$178.25

4.3 \$53.50

## Skill 5: Divide Decimal Numbers

5.1

- a) 0.61
- b) 9.1
- c) 0.62
- d) 0.91
- e) 2.9458
- f) 2.7356
- g) 0.2449
- h) 0.20375

5.2  $603.258 \text{ kms} \div 34.67 \text{ litres} = 17.4 \text{ km/litre}$

5.3 \$27.78

5.4 \$2.75

## Skill 6: Convert a Fraction to a Decimal and Round It Off

6.1

- a) 2.35
- b) 4.6
- c) 53.90
- d) 20.2
- e) 35.6
- f) 80.9
- g) 45.6
- h) 33.0
- i) 26.0
- j) 50.30

## Skill 7: Convert Hours and Minutes to Hours and Tenths

7.1

- a) 0.17 hours
- b) 0.67 hours
- c) 0.25 hours
- d) 16.65 hours
- e) 12.38 hours
- f) 10.2 hours
- g) 18.08 hours
- h) 24.33 hours
- i) 29.5 hours
- j) 8.58 hours

### Challenge My Skills

1.

- a) Feb. 1            7.75 hours  
Feb. 2            4.00 hours  
Feb. 5            7.75 hours  
Feb. 6            7.75 hours  
Feb. 7            4.00 hours  
Feb. 8            4.25 hours
- b) 35.5 hours
- c) \$408.25

2.

- a) \$1,002.75
- b) \$710.50
- c) \$1,260.00
- d) \$3,423.25
- e) The cheapest alternative is to ask the two Level 1 clerks to each work 4 extra hours on Saturday. Cost = \$152.80.  
Cost of a temporary employee = 15 hours  $\times$  \$27.00 = \$405.00.  
Cost of Level IV clerk working Saturday = \$189.00.

- 3. Liz spent \$19.49 on office supplies and returned \$3.96 to petty cash.
- 4. Total deductions, \$78.56; net pay, \$267.33.
- 5. New rent:  $\$350.75 + \$17.50 = \$368.25$ .  
There are two ways of resolving the second part of the question:  
Original rent  $\times$  12 = \$4,209.00 per year. Increased rent  $\times$  12 = \$4,419.00 per year. Therefore the difference is \$210.00.  
Alternatively,  $\$17.50 \times 12 = \$210.00$ .

# Foundation Section

## Estimation Strategies

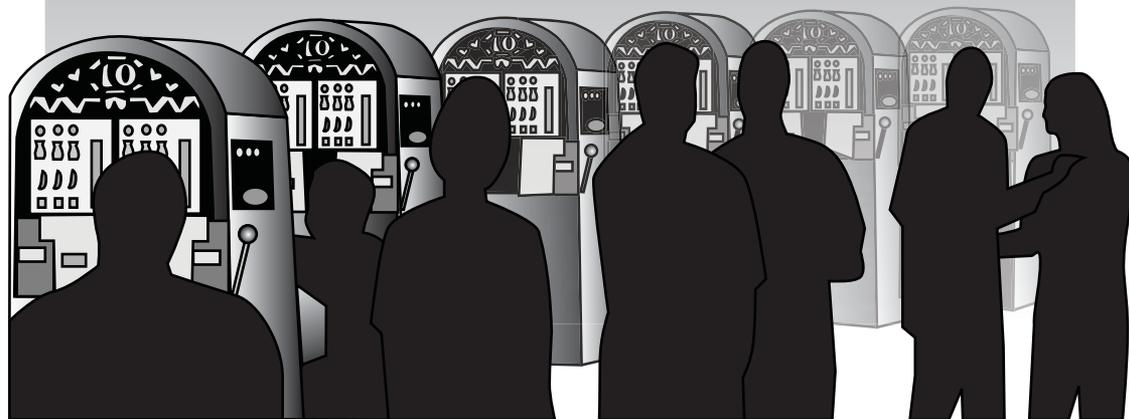
Casino Attendance in August

Week 1 72,250

Week 2 63,819

Week 3 67,490

Week 4 73,180





# Teaching Tips

## Teaching Tip 1

You may have to coach learners to use these techniques of estimation. Research has shown that most learners will not develop these strategies themselves.

You can model estimation strategies as learners calculate an answer to a mathematical problem.

Try asking learners to do these kinds of activities:

- Estimate the distance from their chair to the door to the classroom.
- Estimate other learners' heights, comparing them to their own height.
- Estimate how many chips are in a pile, given that the pile next to it has 100 chips.
- Estimate the length of one of the dining rooms in the casino, given that the width is 75 feet.
- Estimate how much alcohol will be needed to triple the quantity of a recipe that uses 2 oz.

Ask them to create examples of estimation from their own particular jobs.

In each case, ask them how they estimated, and point out what kind of estimation strategy they used.

As participants become more comfortable in using estimation skills, they will be better able to determine whether or not an answer is reasonable.

To be good estimators, learners need to be flexible in their thinking. Over time, they will realize that different strategies can be used when estimating the same problem.

Make sure that learners with limited mathematical skills have multiplication tables. Encourage them to use the tables.

# Introduction

**E**stimation is making a reasonable guess as to the approximate answer to a math problem without doing the actual calculation.

Estimation, like problem-solving, calls for a range of skills and is developed and improved over a long period of time. Estimation demands confidence as well as a set of skills. The skills may be learned quickly, but it takes time and practice to be comfortable using them.

Casino workers use estimation in many ways. They may have to:

- Estimate casino attendance
- Estimate how much cash they have at their station
- Estimate how many place settings (dishes and cutlery) they will need for an event
- Estimate how many people will come to a restaurant
- Estimate how much cleaning solution will be needed for housekeeping
- Estimate future water consumption for a casino
- Estimate weight of supplies to ship from warehouse to casino

In this section you will learn how to:

- Estimate Using Front-End Strategy
- Estimate by Clustering
- Estimate by Rounding One Number
- Estimate by Rounding Two Numbers
- Estimate by Using Rounding Strategy

Some jobs that need Estimation skills

Animatronics Operator  
Bank Supervisor  
Banquet Supervisor  
Bartender  
Beverage Server  
Bingo Volunteer Coordinator  
Bingo/Keno Cashier  
Bingo/Keno/Video (BVK) Attendant (Caller/Checker)  
BVK Supervisor  
Casino Bank Cashier  
Chef  
Dining Room Supervisor  
Guest Services Representative  
Guest Services Supervisor  
Hostess  
Housekeeping Attendant  
Housekeeping Supervisor  
Investigative Security Officer  
Kitchen Helper  
Receiver  
Retail Cashier  
Retail Supervisor  
Security Officer  
Security Supervisor  
Senior Cashier  
Senior Clerk Typist  
Server  
Shuttle Bus Driver  
Slot Attendant  
Slot Floor Supervisor  
Surveillance Technician  
Switchboard Operator  
Tables Game Inspector  
Uniforms Supervisor  
Valet Attendant  
Warehouse Clerk  
Warehouse Supervisor



# Skill 1: Estimate Using Front-End Strategy

TEACHING  
TIPS 1



TELL  
ME



To estimate using the front-end strategy:

**Add up the “front-end” digits.** Front-end digits are the left-most digits. These numbers are the most important when estimating.

SHOW  
ME



To estimate this sum of money, using the front-end strategy:

$$\$1.26 + 4.79 + 0.99 + 1.37 + 2.58$$

Calculate the total of the front-end (dollar) amount:

$$1 + 4 + 1 + 2 = \$8$$

## SOMETHING TO CONSIDER

To estimate more accurately, you can also group cent amounts and add those together.

Group the cent amounts to form one dollar:

|                           |       |
|---------------------------|-------|
| 26 + 79 is approximately  | \$1   |
| 99 cents is approximately | \$1   |
| 37 + 58 is approximately  | \$1   |
|                           | = \$3 |

The more accurate estimate, with the cents grouped, is:

$$\$8 \text{ (Initial estimate)} + \$3 \text{ (adjustment)} = \$11 \text{ (final estimate)}$$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

1.1 Estimate, using front-end strategy:  $3.8 + 4.7 + 3.9 + 5.1 + 3.2$

1.2 Estimate, using front-end strategy:  $4316 + 1529 + 986$

1.3 Estimate, using front-end strategy:  $42 + 79 + 24$

1.4 Estimate, using front-end strategy:  $1.4 + 10.18 + 5.52$

## Skill 2: Estimate Clustering

TELL  
ME



**Estimate clustering** is adding many numbers together when all of the numbers ‘cluster’ around a particular value.

SHOW  
ME



To estimate  $70,132 + 67,783 + 69,987 + 73,212 + 70,324$  by using clustering:

- All numbers are approximately 70,000. Since there are five numbers, multiply 5 by 70,000 for an estimated 350,000.

To estimate  $\$50.12 + \$52.43 + \$48.59$  by using clustering:

- Each number is approximately \$50.00. You can cluster these three numbers together as  $\$50.00 \times 3 = \$150.00$ .

LET ME  
TRY



Now it’s your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

2.1 Estimate, by clustering:  $34,789 + 28,945 + 29,998 + 31,267 + 30,590$

2.2 Estimate, by clustering, the total attendance at the Casino in August 2005:

Casino Attendance in August

Week 1            72,250

Week 2            63,819

Week 3            67,490

Week 4            73,180

## Skill 3: Estimate by Rounding One Number



Some find it easier to **estimate** by **rounding** only **one number** in an equation.



To estimate  $76 \times 89$  by rounding one number:

1. Round 89 to 90.
2. Multiply the numbers:  
 $76 \times 90 = 6840$

To estimate  $45 \times 62$  by rounding one number:

1. Round 62 to 60.
2. Multiply the numbers:  
 $45 \times 60 = 2700$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

3.1 Estimate, by rounding one number,  $24 \times 99 =$

3.2 Estimate, by rounding one number,  $78 \times 9 =$

3.3 Estimate, by rounding one number,  $250 \div 4.7 =$

3.4 Estimate, by rounding one number,  $823 \div 4 =$

## Skill 4: Estimate by Rounding Two Numbers

TELL  
ME



Some people find it easier to estimate by rounding two numbers.

To estimate by rounding two numbers:

1. Round two numbers in an equation.
2. Solve the equation using the two rounded numbers.

SHOW  
ME



– To estimate by rounding the two numbers  $51 \times 62$ :

1. Round the numbers to  $50 \times 60$ .
2. Solve the equation using the two rounded numbers:  
 $50 \times 60 = 3000$

– - To estimate  $145 \times 37$ :

1. Round the numbers to  $150 \times 40$ .

2. Solve the equation:

$$150 \times 40 = 6000$$

– To estimate  $36 \times 75$ :

1. Round the two numbers to  $40 \times 70$ .

2. Solve the equation:

$$40 \times 70 = 2800$$

This is a good estimate as one number was rounded up (36 to 40) and the other number was rounded down (75 to 70).

– To estimate  $253 + 615$ :

1. Round the two numbers to  $200 + 600$ .

2. Solve the equation:

$$200 + 600 = 800$$

You will know that the actual answer is more than 800, because both numbers were rounded down.

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

4.1 Estimate, by rounding two numbers:  $99 \times 44.6$

4.2 Estimate, by rounding two numbers:  $248 \times 51$

4.3 Estimate, by rounding two numbers:  $706 + 823$

4.4 Estimate, by rounding two numbers:  $974 - 250$

4.5 Estimate, by rounding two numbers:  $23 \times 24$



**C**ompare your answers for Let Me Try activities below. If you have less than half the answers correct, review the material and try the activities again.

### Skill 1: Estimate Using Front-End Strategy

1.1  $3.8 + 4.7 + 3.9 + 5.1 + 3.2 = 18$

1.2  $4316 + 1529 + 986 = 5900$

1.3  $42 + 79 + 24 = 130$

1.4  $1.4 + 10.18 + 5.52 = 16$

### Skill 2: Estimate by Clustering

2.1  $30,000 \times 5 = 150,000$

2.2  $70,000 \times 4 = 280,000$

### Skill 3: Estimate by Rounding One Number

3.1 Estimate, by rounding one number,  $24 \times 99 = 24 \times 100 = 2400$

3.2 Estimate, by rounding one number,  $78 \times 9 = 78 \times 10 = 780$

3.3 Estimate, by rounding one number,  $250 \div 4.7 = 250 \div 5 = 50$

3.4 Estimate, by rounding one number,  $823 \div 4 = 800 \div 4 = 200$

### Skill 4: Estimate by Rounding Two Numbers

4.1  $99 \times 44.6 = 100 \times 45 = 4,500$

4.2  $248 \times 51 = 250 \times 50 = 12,500$

4.3  $706 + 823 = 700 + 800 = 1,500$

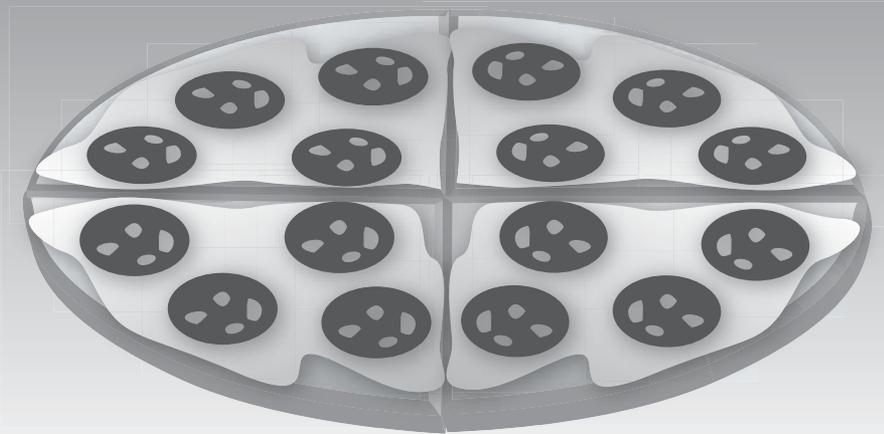
4.4  $974 - 250 = 1,000 - 200 = 800$

4.5  $23 \times 24 = 20 \times 25 = 500$

# Foundation Section

## Fractions

$$\frac{36}{90} = \frac{36 \div 9}{90 \div 9} = \frac{4}{10}$$



$$\left(\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1\right)$$



# Teaching Tips

**S**ome learners may have difficulties understanding the concept of fractions. You can help them by asking them to “play” with different problems before you begin the operation with fractions.

For example:

- Provide students with water and empty containers with different sizes as in the following:

Milk, juice or pop containers:  $\frac{1}{8}$  L,  $\frac{1}{4}$  L,  $\frac{1}{2}$  L, 1L, 1.25 L, 1.5 L, 2 L.  
Don't show them the sizes except for the 1L.

Ask them to fill each container except the 1 L container with water. Now, ask them to use the water from small containers (they can re-fill any number of times) to fill the larger ones.

Ask them to find out:

How many  $\frac{1}{4}$  L containers it takes to fill the 1 L container?

How many  $\frac{1}{2}$  L containers it takes to fill the 1 L container?

How many  $\frac{1}{8}$  L containers it takes to fill the 1 L container?

How many  $\frac{1}{8}$  L containers it takes to fill the  $\frac{1}{4}$  L container?

How many  $\frac{1}{4}$  L containers it takes to fill 2 L container?

Etc.

Ask them to find the relationships between the different sizes of containers and write them down. For example:

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1\text{L}$$

$$\frac{1}{8} + \frac{1}{8} = \frac{1}{4}\text{ L}$$

$$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}\text{ L}$$

Etc.

- Use a pizza or a pie to show the concept of fractions. Start with the whole pizza.

Ask them which is larger: the pizza, or one piece?

Cut the pizza into four equal pieces. Ask them how much one of these pieces is compared to the whole pizza ( $\frac{1}{4}$ ). Ask them to add each fraction of the pizza to make the whole ( $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$ )

Ask them how much two pieces is out of the whole pizza ( $\frac{2}{4}$ ). How much of the pizza is this? ( $\frac{2}{4} = \frac{1}{2}$ )

Cut the pizza into eight equal pieces. Now ask them how much each piece is compared with the whole pizza ( $\frac{1}{8}$ ).

Ask them how many pieces would you need to have one per learner. Ask what fraction of the pizza each learner will get. Make sure you have enough pizza to share with all the learners!

Ask them which is the greatest fraction:  $\frac{2}{3}$  or  $\frac{3}{4}$ . They may come up with different ways of thinking about this:

- $\frac{3}{4}$  is greater than  $\frac{2}{3}$  because with the first one you need just  $\frac{1}{4}$  to complete the whole and with the second one you need  $\frac{1}{3}$  to complete the whole. Therefore, because  $\frac{1}{4}$  is less than  $\frac{1}{3}$ ,  $\frac{3}{4}$  is greater than  $\frac{2}{3}$ .
- They may also draw two whole pizzas. They may cut one in thirds and colour  $\frac{2}{3}$  of it. They may cut the other in quarters and colour  $\frac{3}{4}$  of it. Then they may compare which part is larger.
- Another way of looking at this is to convert the fractions into decimals and then compare the two numbers.



This is a good way to get learners to start thinking about fractions. Ask them to calculate fractions in their heads, without doing the operation on paper. They probably already use strategies for mentally calculating fractions. Help them find out what those strategies are.

Ask them to calculate in their heads:

$$1 + \frac{1}{4} + 3 =$$

The answer is  $4\frac{1}{4}$ .

Discuss how they arrived at their answers.

Ask them to calculate in their heads: twice, three times and half of  $\frac{1}{4}$ ;  $\frac{3}{5}$ ;  $\frac{3}{4}$ ;  $\frac{2}{3}$ , etc



Some strategies the learners may have used are:

- To add fractions, add up the whole numbers first and then add on the fractions.
- To multiply fractions by a number, add that number of fractions together:  
(Three times  $\frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 1 \frac{1}{2}$ )

Ask learners to compare fractions to decide which fraction is larger, using the following example:

Two people bought several tickets at a community fundraiser. Two of the tickets that they bought are winners. One ticket was drawn for  $\frac{1}{5}$  of the \$100 prize money pot, and the other for  $\frac{3}{4}$  of the prize money. There is only one prize pot, and only one winning ticket per person. Which ticket would they cash in and why? Prove your answer.

Discuss how they will show their answer is correct. For instance, one learner may convert a fraction into decimal and then compare them. Another could do a drawing. Another could write equivalent fractions with the same denominator as  $\frac{1}{5}$  and  $\frac{3}{4}$  and then compare them. Another could say that you need  $\frac{1}{4}$  to complete the whole in the first fraction and in the second fraction you need  $\frac{1}{5}$ . Because  $\frac{1}{4}$  is larger than  $\frac{1}{5}$ , the second fraction is the largest one.

# Introduction

**M**ost workers in the gaming industry will at some time need to understand fractions.

Gaming industry workers may use fractions for:

- Calculating winnings and losses
- Calculating prices in sales
- Performing maintenance work (e.g. measuring wood)
- Calculating amounts for cooking
- Calculating staff time and staff needs

It is a good idea to think of **fractions** as **part** of a **whole**. Fractions are written with **two parts**, both of which must be whole numbers. The **top** of a fraction is called the **numerator**. The **bottom** is called the **denominator**.

|                   |   |  |   |
|-------------------|---|--|---|
| Proper fraction   | When the top is less than the bottom                                | Describes fractional values between 0 and 1. | $\frac{3}{4}, \frac{1}{5}, \frac{9}{11}, \frac{5}{8}$ |
| Improper fraction | When the top is greater than the bottom                             | Describes fractional values greater than 1.  | $\frac{5}{4}, \frac{3}{2}, \frac{11}{8}, \frac{7}{3}$ |
| Mixed number      | When an expression consists of a whole number and a proper fraction | Describes fractional values greater than 1.  | $6\frac{5}{8}; 3\frac{1}{2}; 5\frac{2}{3}$            |

$$\left(\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1\right)$$



Some jobs that need Fractions skills

Bartender  
Beverage Server  
Cook  
Chef  
Hostess  
Housekeeping Attendant  
Housekeeping Supervisor  
Kitchen Helper  
Maintenance Technician  
Uniforms Supervisor  
Uniform Technician

In this section, you will learn how to:

- Write Equivalent Fractions
- Convert Mixed Fractions to Improper Fractions
- Reduce Fractions to Lowest Terms
- Convert Improper Fractions to Mixed Fractions
- Multiply Fractions
- Divide Fractions
- Add and Subtract Fractions

## Skill 1:

# Write Equivalent Fractions

TEACHING  
TIPS 1



TELL  
ME



**Equivalent fractions** are fractions that have the **same value** or represent the same part of an object. There are an **infinite** number of **ways** to **write** any **fraction**.

To get equivalent fractions:

- **Multiply** or **divide** the **top** and **bottom** of one fraction by the **same number**.

To **test** if two fractions are equivalent:

- **Cross-multiply** their tops and bottoms. This is also called “**taking the cross-product**”.

SHOW  
ME



The fraction  $\frac{1}{2}$  can be written in many ways. For example:

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \dots = \frac{17}{34} = \dots$$

In the above example, notice that the value in the top is always half of the value in the bottom. No matter how you write it, the fraction is equal to  $\frac{1}{2}$ .

To get an equivalent fraction from  $\frac{5}{9}$  :

- Multiply top and bottom by any same number. For example, when you multiply it by 4, you get this:

$$\frac{5 \times 4}{9 \times 4} = \frac{20}{36}$$

To test if  $\frac{5}{9}$  is equivalent to  $\frac{20}{36}$  :

- Take the cross-product, or cross-multiply their tops and bottoms:  
 $5 \times 36 = 180$  and  $9 \times 20 = 180$   
So the fractions are equivalent.

**LET ME  
TRY**



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 1.1 A security worker is trying to find out if the ratio of women to overall attendance has changed from last week to this week. Last week there were three women for every seven people. This can be expressed as  $\frac{3}{7}$ .
- Today, there are 18 women out of a total of 42 people. This can be written as  $\frac{18}{42}$ . Has the ratio of women to overall attendance changed from last week? (Are  $\frac{3}{7}$  and  $\frac{18}{42}$  equivalent fractions?)
- 1.2 Test if  $\frac{2}{4}$  and  $\frac{13}{20}$  are equivalent fractions.
- 1.3 Find five equivalent fractions for:  $\frac{4}{7}$
- 1.4 Find five equivalent fractions for:  $\frac{6}{13}$

## Skill 2:

# Convert Mixed Fractions to Improper Fractions

TEACHING  
TIPS 2



TELL  
ME



**Mixed fractions**, such as  $2\frac{1}{2}$  or  $5\frac{3}{4}$ , are much **harder** to use in **calculations** than are **improper fractions**. We **convert** mixed fractions to improper fractions so that we may work with them.

To convert a mixed fraction to an improper fraction:

1. **Multiply** the whole number by the bottom.
2. Add this answer to the top.
3. Write the same **bottom**.

SHOW  
ME



This table shows the steps used to convert mixed fractions to improper fractions:

| Mixed fraction | 1. Multiply the whole number by the bottom | 2. Add this answer to the top | 3. Write the same bottom | Improper fraction |
|----------------|--|-------------------------------|--------------------------|-------------------|
| $2\frac{3}{5}$ | $2 \times 5 = 10$                          | $10 + 3 = 13$                 | 5                        | $\frac{13}{5}$    |
| $3\frac{5}{8}$ | $8 \times 3 = 24$                          | $24 + 5 = 29$                 | 8                        | $\frac{29}{8}$    |

LET ME  
TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

2.1 As a maintenance worker at the casino, you must figure out how much cloth you need to upholster some chairs. Convert the following amounts of cloth to express them as improper fractions:

- a)  $1\frac{5}{6}$       b)  $2\frac{4}{5}$       c)  $3\frac{4}{9}$       d)  $2\frac{3}{4}$       e)  $1\frac{5}{12}$

## Skill 3: Reduce a Fraction to Lowest Terms

TELL  
ME



We **reduce** fractions to their **lowest terms** to make it easier to calculate with them. To reduce a fraction to its lowest terms:

1. If it is a mixed fraction, **convert** it to an **improper fraction**.
2. **Divide** the **top** and **bottom** of any fraction by the **same value**. Continue this process until there is nothing common in the top and bottom of the fraction. You may not be able to reduce a fraction to lowest terms in one step. In fact, the larger the fraction, the more difficult this may be. You may have to divide the top and bottom several times to find the lowest value of the fraction.

SHOW  
ME



– To reduce  $1\frac{6}{18}$  to its lower terms:

1. Convert the mixed fraction to an improper fraction.

$$1\frac{6}{18} = 1 + \frac{6}{18} = \frac{18}{18} + \frac{6}{18} = \frac{24}{18}$$

2. Divide the top and bottom of the fraction by the same value.

You can reduce top and bottom by dividing them by 6:

$$\frac{24}{18} = \frac{24 \div 6}{18 \div 6} = \frac{4}{3}$$

- To reduce  $\frac{36}{90}$  to its lowest terms, you go directly to step 3, as it is a proper fraction.

3. Divide the top and bottom of the fraction by the same value:

You can reduce top and bottom by dividing each by 9:

$$\frac{36}{90} = \frac{36 \div 9}{90 \div 9} = \frac{4}{10}$$

You can further reduce this by 2:

$$\frac{4}{10} = \frac{4 \div 2}{10 \div 2} = \frac{2}{5}$$

**LET ME  
TRY**



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

3.1 Reduce each fraction to its lowest terms.

|                    |  |
|--------------------|--|
| a) $\frac{18}{30}$ |  |
| b) $\frac{35}{75}$ |  |
| c) $\frac{12}{18}$ |  |
| d) $\frac{24}{36}$ |  |
| e) $\frac{15}{25}$ |  |

## Skill 4: Convert Improper Fractions to Mixed Fractions

TEACHING  
TIPS 3



TELL  
ME



To convert an improper fraction to a mixed fraction:

1. **Divide** the top by the bottom.

For example:

$$^{15}/_4 = 15 \div 4$$

2. Write the **quotient** as the **whole number** part and the **remainder** as the **numerator** (top).
3. Write the same denominator (bottom) and write it as a mixed fraction.

$$15 \div 4 = ^{15}/_4 = 3 \frac{3}{4}$$

SHOW  
ME



This table shows the steps used to convert improper fractions to mixed fractions.

| Improper fraction | 1.<br>Perform the<br>division | 2.<br>Remainder | 3.<br>Write as a mixed<br>fraction |
|-------------------|-------------------------------|-----------------|------------------------------------|
| $\frac{19}{6}$    | $6 \overline{)19}$            | 1               | $3 \frac{1}{6}$                    |
| $\frac{23}{5}$    | $5 \overline{)23}$            | 3               | $4 \frac{3}{5}$                    |

# LET ME TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

4.1 The following improper fractions express the amounts of yards of cloth needed to fix some hotel room chairs. Convert each of these amounts to mixed fractions:

- a)  $\frac{5}{3}$       b)  $\frac{13}{4}$       c)  $\frac{23}{7}$       d)  $\frac{18}{5}$       e)  $\frac{31}{12}$

## Skill 5: Multiply Fractions

### TELL ME



Follow these steps to **multiply** two or more **fractions**:

1. **Convert mixed fractions** to improper fractions.
2. **Reduce** top and bottom, if possible.
3. **Multiply** the tops together and the bottoms together.
4. **Convert the improper fraction** back to a mixed fraction, if possible.

### SHOW ME



This table shows the steps used to multiply two or more fractions.

|                                     | 1.<br>Convert to<br>improper<br>fractions | 2.<br>Reduce<br>bottom and top, if<br>possible          | 3.<br>Multiply the tops<br>together and the<br>bottom together | 4.<br>Convert<br>back to<br>a mixed<br>fraction |
|-------------------------------------|---|---|--|---|
| $1\frac{5}{7} \times 1\frac{7}{8}$  | $\frac{12}{7} \times \frac{15}{8}$        | $\frac{12 \div 4}{7} \times \frac{15}{8 \div 4}$        | $\frac{3}{7} \times \frac{15}{2} = \frac{45}{14}$              | $3\frac{3}{14}$                                 |
| $\frac{15}{16} \times 2\frac{2}{3}$ | $\frac{15}{16} \times \frac{8}{3}$        | $\frac{15 \div 3}{16 \div 8} \times \frac{8 \div 8}{3}$ | $\frac{5}{2} \times \frac{1}{1} = \frac{5}{2}$                 | $2\frac{1}{2}$                                  |

## SOMETHING TO CONSIDER

Reducing any top with any bottom before we multiply only works for multiplication. This does not work for divisions, additions or subtractions.

# LET ME TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

5.1 Complete the following multiplication. Reduce your answers to lowest terms.

|   |  |
|---|--|
| a) $\frac{4}{5} \times \frac{3}{7}$     |  |
| b) $1\frac{7}{9} \times \frac{7}{12}$   |  |
| c) $2\frac{2}{5} \times \frac{8}{9}$    |  |
| d) $\frac{12}{25} \times \frac{15}{16}$ |  |
| e) $2\frac{1}{12} \times 1\frac{3}{5}$  |  |
| f) $\frac{14}{15} \times 2\frac{1}{7}$  |  |

## Skill 6: Divide Fractions

TELL  
ME



The two fractions in a division are called the **dividend (first one)** and the **divisor (second one)**.

When dividing two fractions:

1. **Convert to improper fractions.**
2. **Invert** the divisor.
3. **Reduce** the fractions as in a regular multiplication and multiply the fractions instead.
4. **Convert** back to a **mixed fraction**, if possible.

SHOW  
ME



This table shows the steps used to divide fractions.

|                                 | 1.<br>Convert to<br>improper<br>fractions | 2.<br>Invert the<br>divisor       | 3.<br>Reduce the fractions and<br>multiply the fractions<br>instead               | 4.<br>Convert back<br>to a mixed<br>fractions |
|---------------------------------|---|-----------------------------------|---|---|
| $1\frac{7}{8} \div \frac{1}{6}$ | $\frac{15}{8} \div \frac{1}{6}$           | $\frac{15}{8} \times \frac{6}{1}$ | $\frac{15}{8 \div 2} \times \frac{6 \div 2}{1} = \frac{15}{4} \times \frac{3}{1}$ | $= \frac{45}{4} = 11\frac{1}{4}$              |
| $\frac{3}{5} \div \frac{4}{7}$  |   | $\frac{3}{5} \times \frac{7}{4}$  | $\frac{3 \times 7}{5 \times 4}$   | $\frac{21}{20} = 1\frac{1}{20}$               |

LET ME  
TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 6.1 Complete the following divisions. Reduce your answers to lowest terms.

|                                      |  |
|--------------------------------------|--|
| a) $\frac{5}{9} \div \frac{3}{5}$    |  |
| b) $\frac{5}{9} \div 1\frac{2}{3}$   |  |
| c) $1\frac{7}{8} \div 1\frac{3}{4}$  |  |
| d) $1\frac{1}{15} \div 2\frac{2}{3}$ |  |
| e) $2\frac{2}{5} \div 1\frac{1}{15}$ |  |

## Skill 7: Find Common Denominators and Add and Subtract Fractions

TELL  
ME



To add or subtract two or more fractions, the fractions must have the same bottoms. This shared bottom is the “**common denominator**”. The smallest possible value is called the *lowest common denominator*, or *LCD*. Technically, any common denominator will do. However, the smaller the denominator we use, the easier the calculations will be.

If you can identify the LCD, use it straight away. If you cannot, then use the following method:

1. Write down a list of multiples of each of the denominators.
2. Compare the two lists. The smallest value that appears in **both** lists is a common denominator.

### SOMETHING TO CONSIDER

Please note that common denominators were **not** needed in multiplication and division.

This table shows the steps used to add and subtract fractions:

| To Add or Subtract Fractions     | Instructions  |
|----------------------------------|---|
| If the bottoms are the same:     | <ol style="list-style-type: none"> <li>1. Convert mixed fractions to improper fractions.</li> <li>2. Combine the tops appropriately and leave the same bottom.</li> <li>3. Reduce the fraction if it is possible.</li> <li>4. Convert into mixed fractions.</li> </ol>  |
| If the bottoms are not the same: | <ol style="list-style-type: none"> <li>1. Convert mixed fractions to improper fractions.</li> <li>2. Find the LCD.</li> <li>3. Write the equivalent fractions using the LCD you found in step #2.</li> <li>4. Combine the tops appropriately.</li> <li>5. Leave the bottom alone.</li> <li>6. Reduce the fraction if it is possible.</li> <li>7. Convert into mixed fractions.</li> </ol> |

Use the following method to add or subtract **fractions with the same bottoms**.

| Add or subtract fractions with same bottoms | Convert mixed fractions to improper fraction | Combine the tops appropriately And leave the same bottom | Reduce fractions                             | Convert to mixed fractions   | Answer         |
|---|--|--|--|------------------------------|----------------|
| $\frac{3}{7} + \frac{2}{7}$                 | -----  | $= \frac{3+2}{7} = \frac{5}{7}$                          | -----  | -----                        | $\frac{5}{7}$  |
| $\frac{11}{12} - \frac{5}{12}$              | -----  | $= \frac{11-5}{12} = \frac{6}{12}$                       | $= \frac{6 \div 6}{12 \div 6} = \frac{1}{2}$ | -----                        | $\frac{1}{2}$  |
| $2\frac{1}{4} - \frac{3}{4}$                | $= \frac{9}{4} - \frac{3}{4}$                | $= \frac{9-3}{4} = \frac{6}{4}$                          | $= \frac{6 \div 2}{4 \div 2} = \frac{3}{2}$  | $\frac{3}{2} = 1\frac{1}{2}$ | $1\frac{1}{2}$ |

Use the following method to add or subtract **fractions with different bottoms**.

|  |   |  |   |
|--|---|--|---|
| 1. Convert mixed fractions to improper fractions | $\frac{1}{4} + \frac{1}{18} =$  | $\frac{5}{6} + 1\frac{1}{4} = \frac{5}{6} + \frac{5}{4}$   | $2\frac{3}{4} - 1\frac{5}{8} = \frac{11}{4} - \frac{5}{8}$          |
| 2. Find the LCD                                  | - Multiples of 4 are:<br>4, 8, 12, 16, 20, 24,<br>28, 32, 36, 40, 44...<br><br>- Multiples of 18 are:<br>18, 36, 54, 72...<br><br>- 36 is the LCD | - Multiples of 4 are: 4, 8,<br>12, 16, 20, 24...<br><br>- Multiples of 6 are: 6, 12,<br>18, 24...<br><br>- 12 is the LCD | - as seen from the first example, the LCD of 4 and 18 is 36         |
| 3. Write the equivalent fractions using the LCD  | $\frac{1}{4} = \frac{1 \times 9}{4 \times 9} = \frac{9}{36}$<br>and<br>$\frac{1}{8} = \frac{1 \times 2}{8 \times 2} = \frac{2}{16}$               | $= \frac{5 \times 2}{6 \times 2} + \frac{5 \times 3}{4 \times 3} = \frac{10 + 15}{12}$                                   | $= \frac{11 \times 9}{4 \times 9} - \frac{5 \times 2}{18 \times 2}$ |
| 4. Combine the tops appropriately                | $\frac{18}{9} + \frac{18}{36}$  | $10 + 15$  | $99 - 10$   |
| 5. Leave the bottom alone                        | $\frac{9}{36} + \frac{2}{36} = \frac{9+2}{36}$<br>$\frac{11}{36}$   | $= \frac{5 \times 2}{6 \times 2} + \frac{5 \times 3}{4 \times 3} = \frac{10 + 15}{12}$<br>$= \frac{25}{12}$              | $= \frac{99 - 10}{36} = \frac{89}{36}$                              |
| 6. Reduce fraction if it is possible             | Not possible to reduce  | Not possible to reduce   | Not possible to reduce  |
| 7. Convert into mixed fractions                  | Not an improper fraction  | $= 2\frac{1}{12}$  | $= 2\frac{17}{36}$  |

# LET ME TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

7.1 Complete the following additions and subtractions. Reduce your answers to lowest terms.

|                                  |  |
|----------------------------------|--|
| a) $\frac{1}{9} + \frac{5}{9}$   |  |
| b) $1\frac{3}{8} - \frac{5}{8}$  |  |
| c) $\frac{1}{4} + \frac{3}{8}$   |  |
| d) $2\frac{1}{5} + 1\frac{2}{3}$ |  |
| e) $2\frac{1}{6} - 1\frac{3}{4}$ |  |
| f) $2\frac{2}{3} + 1\frac{3}{4}$ |  |
| g) $2\frac{1}{3} + \frac{5}{12}$ |  |
| h) $2\frac{1}{12} - \frac{3}{8}$ |  |

# Challenge My Skills

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**C**hallenge your skills from this chapter using these multi-skill practice activities. See Check My Answers at the end of the section for the correct answers.

1. The winnings from a particular horse race were \$3,200.00. One half of the winnings are paid to the horse's owner, one-quarter is paid to the trainer and one-eighth is paid to the rider. How much did each person receive?
2. In the Triple Z retail outlet, plush toys are on sale for \$6.50, which is  $\frac{1}{4}$  off the regular price. What is the regular price?
3. To upholster one dining room chair, Rod needs  $1\frac{1}{4}$  yards of polyester brocade and  $\frac{5}{8}$  yard of leatherette. There are 36 chairs to be re-upholstered. The leatherette costs \$14.50 per yard, and the brocade costs \$21.95 per yard. What will be the cost of the fabric (before taxes) be to re-upholster these armchairs?
4. If ten people can finish a job in three-quarters of an hour, how long will it take one person to finish the same job?
5. Plywood is made by bonding three layers of material: backing is  $\frac{3}{8}$ " thick; core is  $\frac{5}{16}$ " thick, and top/veneer is  $\frac{1}{4}$ " thick. What is the total thickness of a sheet of plywood?
6. The ratio of guest wins to losses at a blackjack table is 3:27. What fraction of the games are losses? What fraction of the games are wins?
7. There are about 1700 employees at all the casinos managed by the Triple Z Corporation. If the ratio of women to men is 3:2, what fraction of the staff are men? How many women employees are there?
8. To make a certain recipe you need  $\frac{5}{8}$  tsp. of baking powder. If you need to double the recipe, how much will you need?
9. A regular  $2 \times 4$  stud actually measures  $1\frac{1}{2}$ " by  $3\frac{1}{2}$ ". How much was trimmed off each side of the rough  $2 \times 4$  lumber to make the stud?
10. Muffins normally take  $1\frac{3}{4}$  cups of raisins. The cook needs to triple this recipe. How many cups of raisins will he need?



**C**ompare your answers for Let Me Try activities and Challenge My Skills activities above. If you have less than half the answers correct, review the material and try the activities again.

### Skill 1: Write Equivalent Fractions

1.1 Yes, they are equivalent:  $3 \times 42 = 126$  and  $18 \times 7 = 126$

1.2 No, they are not equivalent:  $2 \times 20 = 40$  and  $13 \times 4 = 52$

1.3 Five equivalent fractions for  $\frac{4}{7}$  :  
 $\frac{8}{14}, \frac{12}{21}, \frac{20}{35}, \frac{40}{70}, \frac{100}{175}$

1.4 Five equivalent fractions for  $\frac{6}{13}$  :  
 $\frac{12}{26}, \frac{18}{39}, \frac{24}{52}, \frac{30}{65}, \frac{36}{78}$

### Skill 2: Convert Mixed Fractions to Improper Fractions

2.1

a)  $\frac{11}{6}$     b)  $\frac{14}{5}$     c)  $\frac{31}{9}$     d)  $\frac{11}{4}$     e)  $\frac{17}{12}$

### Skill 3: Reduce a Fraction to Lowest Terms

3.1

a)  $\frac{3}{5}$     b)  $\frac{7}{15}$     c)  $\frac{2}{3}$     d)  $\frac{2}{3}$     e)  $\frac{3}{5}$

## Skill 4: Convert Improper Fractions to Mixed Fractions

4.1

a)  $1\frac{2}{3}$     b)  $3\frac{1}{4}$     c)  $3\frac{2}{7}$     d)  $3\frac{3}{5}$     e)  $2\frac{7}{12}$

## Skill 5: Multiply Fractions

5.1

a)  $\frac{12}{35}$     b)  $1\frac{1}{27}$     c)  $2\frac{2}{15}$     d)  $\frac{9}{20}$     e)  $3\frac{1}{3}$   
f) 2

## Skill 6: Divide Fractions

6.1

a)  $\frac{25}{27}$     b)  $\frac{1}{3}$     c)  $1\frac{1}{14}$     d)  $\frac{2}{5}$     e)  $2\frac{1}{4}$

## Skill 7: Find Common Denominators and Add and Subtract Fractions

7.1

a)  $\frac{2}{3}$     b)  $\frac{3}{4}$     c)  $\frac{5}{8}$     d)  $3\frac{3}{15}$     e)  $\frac{5}{12}$   
f)  $4\frac{5}{12}$     g)  $2\frac{3}{4}$     h)  $1\frac{17}{24}$

## Challenge My Skills

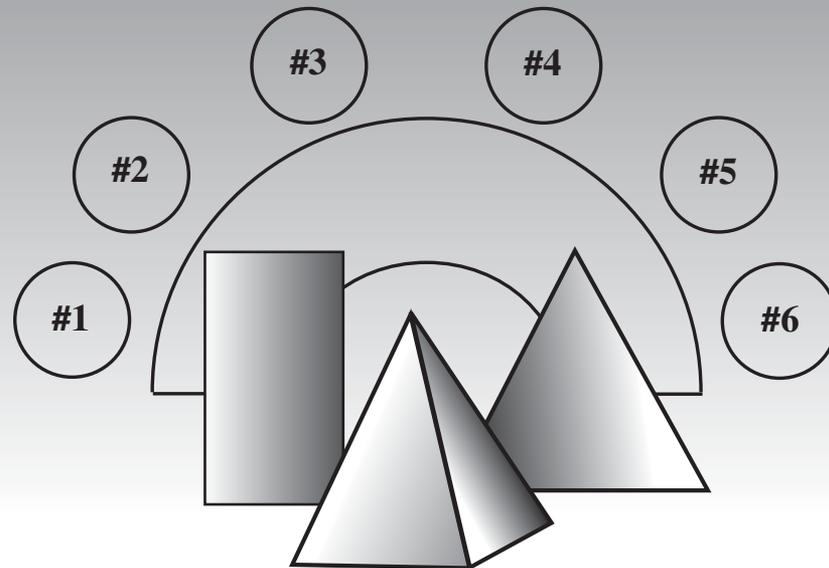
1. \$1,600.00 to the owner, \$800.00 to the trainer, \$400.00 to the rider
2. \$8.67
3.  $\$987.75 + \$326.25 = \$1,314.00$
4.  $7\frac{1}{2}$  hours
5.  $\frac{15}{16}$ " thick
6.  $\frac{1}{10} =$  wins,  $\frac{9}{10} =$  losses
7.  $\frac{2}{5}$  of the employees are men. 1,020 individuals are women.
8.  $1\frac{1}{4}$  tsp. will be needed.
9.  $\frac{1}{4}$  is taken off each side.
10.  $5\frac{1}{4}$  cups of raisins will be needed.

# Foundation Section

## Geometry

$$2\pi r \text{ or } \pi d$$

$$V = \frac{4}{3} \times \pi \times r^3$$



# Teaching Tips

## Area

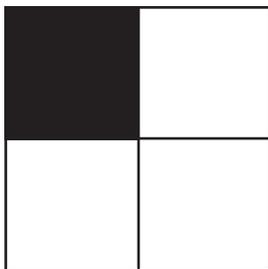
Before you give students the formulas to calculate areas, you can try some of the following exercises:

Give them different shapes, such as squares, rectangles, octagons, etc. (regular and irregular) and squares with sides of 1 inch, 1 cm, 1 foot and ask them to calculate how many square inches they need to cover those shapes.

It is interesting to compare how much the area and the perimeter of a shape changes, when all of the sides change length in the same proportion.

When you have, for example, a rectangle whose sides measure 3 cm wide and 2 cm long, the area of this rectangle is  $3 \text{ cm} \times 2 \text{ cm} = 6 \text{ cm}^2$  and the perimeter is  $2 \times 3 \text{ cm} + 2 \times 2 \text{ cm} = 10 \text{ cm}$ .

If you have another rectangle with sides that are **2 times** larger than the original: 6 cm wide and 4 cm length, the perimeter will be **double**:  $2 \times 6 \text{ cm} + 2 \times 4 \text{ cm} = 20 \text{ cm}$  **but** the area will be **four times** the original:  $A = 6 \text{ cm} \times 4 \text{ cm} = 24 \text{ cm}^2$



Have a measuring tape available for the learners.

- Ask them to measure the room, and then to calculate how many square feet of carpeting they would need to cover the floor.
- Ask them to measure the tops of a square or rectangular table. How much material would be needed to make a new table top for the table? How much material would be needed to make a new table top for a table with sides two times longer than the original?

**TEACHING  
TIPS 2**



To understand the meaning of  $\pi$  you may give learners different circles of paper and some string that they can use to measure the length of the border of each circle.

Ask them to divide the number they got by the diameter of their respective circle. This will give them the number  $\pi$ .

# Introduction

**G**eometry skills are important for many gaming industry workers. You may need to use geometry for a variety of tasks. For example, you have to calculate the area of a floor to determine how much carpeting you will need to cover it. You need to know the perimeter of a parking lot to determine how much fencing you will build to surround it. You may need to know the volume of a water tank to know how much water you need to fill it. In the warehouse, you may need to know the volume of stock to calculate the cost of shipping.

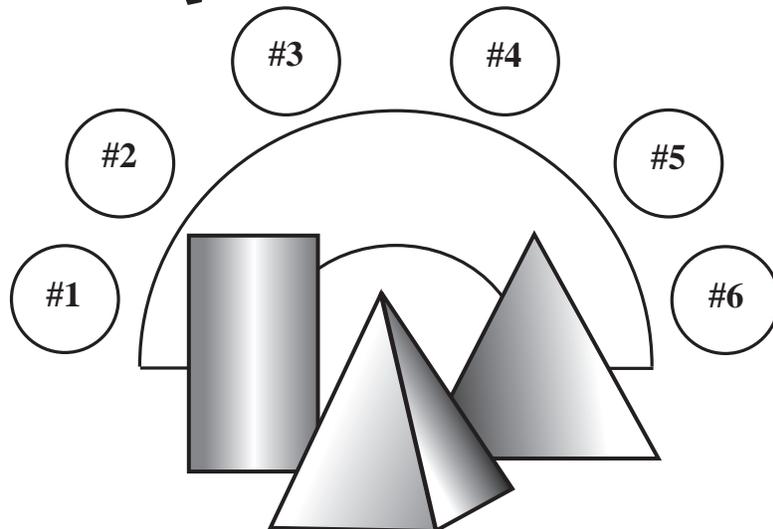
In this chapter you will learn how to:

- Calculate Perimeters
- Calculate Area
- Calculate the Volume of a Prism
- Calculate the Perimeter and Area of a Circle

$$2\pi r \text{ or } \pi d$$
$$V = \frac{4}{3} \times \pi \times r^3$$

Some jobs that need Geometry skills

Casino Bank Cashier  
Chef  
Cook  
Dealer  
Facilities Supervisor  
Facility Technician  
Maintenance Technician  
Slot Floor Supervisor  
Uniforms Technician  
Warehouse Supervisor  
Department Manager  
Tables Game Inspector  
Uniforms Supervisor  
Uniforms Technician



# Skill 1: Calculate Perimeters

TELL  
ME



The **perimeter** is the **distance around the outside of a two-dimensional shape**.

To calculate the perimeter:

- **Measure** the **lengths** of **all** the **sides** of the **shape**.
- **Add** the **lengths** of each side.

## SOMETHING TO CONSIDER

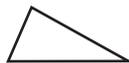
Since a rectangle has two pairs of equal parallel sides, you can calculate the perimeter by multiplying the length of each side by two and adding the totals.

Since a square has four equal sides, you can find the perimeter by multiplying the length of one side by four.

SHOW  
ME



To find the perimeter of a triangle with sides measuring 5 centimetres, 9 centimetres and 11 centimetres:



$$P = 5 \text{ cm} + 9 \text{ cm} + 11 \text{ cm} = 25 \text{ cm}$$

To find the perimeter of a square with each side measuring 2 inches:



$$P = 4 \times 2 \text{ in} = 8 \text{ in}$$

To find a perimeter of a rectangle with a length of 8 centimetres and a width of 3 centimetres:



$$P = 2 \times 8 \text{ cm} + 2 \times 3 \text{ cm}$$

$$P = 16 \text{ cm} + 6 \text{ cm}$$

$$P = 22 \text{ cm}$$

## SOMETHING TO CONSIDER

Be sure to only add similar units.

For example, you cannot add inches to feet. To find the perimeter of a rectangle with sides of 9 inches and 1 foot, you must first change to the same units.

$$\text{perimeter} = 2b + 2h$$

**INCORRECT:**

$$\text{perimeter} = 2 \times 9 + 2 \times 1 = 18 + 2 = 20$$

**CORRECT:**

$$\text{perimeter} = 2 \times 9 \text{ inches} + 2 \times 1 \text{ foot}$$

$$9 \text{ inches} = \frac{3}{4} \text{ foot}$$

Then

$$P = 2 \times \frac{3}{4} \text{ foot} + 2 \times 1 \text{ foot}$$

$$P = \frac{3}{2} \text{ feet} + 2 \text{ feet}$$

$$P = 3 \frac{1}{2} \text{ feet}$$

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers

- 1.1 You are building a fence around the casino parking lot and must find the perimeter. The lot is a square with each side measuring 300 metres. How many metres of fencing will you need?
- 1.2 The new casino lobby will have a triangle-shaped fountain. You need to know the perimeter of the fountain to create a floral border. The sides measure: 20 feet, 20 feet and 15 feet long.
- 1.3 The new banquet tables for the casino are rectangular. You must know the perimeter so that you can order enough material to make decorative borders. Each table measures 2.5 metres long and 1 metre wide. What is the perimeter of each table?

# Skill 2:

# Calculate Area



TELL ME



The **area** of a shape is a number that tells **how many square units are needed to cover the shape**. Area can be **measured in different units, such as square feet, square metres, or square inches**.

To find the area of a shape, use the following formulas:

|             | Square  | Rectangle  | Triangle  |
|-------------|---|--|---|
| <b>Area</b> | $A = \text{side} \times \text{side} =$  | $A = \text{base} \times \text{height}$   | $A = \frac{1}{2} \text{base} \times \text{height}$  |
|             | <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <math>A = s \times s</math><br/> <math>A = s^2</math> </div> | <div style="display: flex; align-items: center; justify-content: center;"> <span style="margin-right: 10px;">height</span> <div style="border: 1px solid black; padding: 5px;"> <math>A = b \times h</math> </div> </div> <div style="text-align: center; margin-top: 5px;">base</div> | <div style="text-align: center;"> <p style="margin-top: 5px;">base</p> <ol style="list-style-type: none"> <li>1. showing the base</li> <li>2. showing the height of this base</li> </ol> </div> |

## SOMETHING TO CONSIDER

The height is a segment that is perpendicular to the base. For a rectangle, the base and height are often called the "length" and the "width". Sometimes the height is referred to as the "altitude".

## SOMETHING TO CONSIDER

Since the base and height are always the same number for a square, we usually call them "sides".

The **metric system** uses powers to show area:

$$A = b \times h$$

$$A = (10 \text{ m})(15 \text{ m}) \quad \text{metres multiplied by metres}$$

$$A = 150 \text{ m}^2 \quad \text{product is in units}^2$$

The **Imperial system** does not use powers to show area:

$$A = b \times h$$

$$A = 20 \text{ ft.} \times 22 \text{ ft.}$$

$$A = 440 \text{ sq. ft. (square feet)}$$

## SOMETHING TO CONSIDER

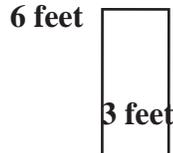
Powers are a "shorthand format" for writing numbers multiplied by themselves.

A power looks like this:

$x^y$  where  $x$  is the "base" and  $y$  is the "exponent".  
This means that  $x$  is multiplied by itself  $y$  times.

E.g.  $2^4 = 2 \times 2 \times 2 \times 2$   
 $= (2)(2)(2)(2)$   
 $= 16$

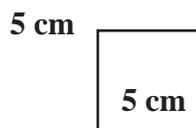
**SHOW  
ME**



Let's find the area of this rectangle, with a base measuring 3 feet and a height measuring 6 feet. Use the formula:

$$A = 3 \text{ feet} \times 6 \text{ feet}$$

$$A = 18 \text{ square feet}$$



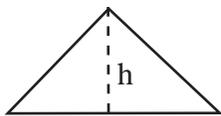
If the length of one side of this square is 5 centimetres, calculate the area by substituting the value "5 cm" into the formula:

$$A = s^2$$

$$A = (5 \text{ cm})^2$$

$$A = 25 \text{ cm}^2 \text{ (square centimetres)}$$

To find the area of a triangle with a base length of 23 feet and a height of 16



**23 feet**

feet, substitute the values into the formula:

$$A = \frac{1}{2} b \times h$$

$$A = \frac{1}{2} (23 \text{ feet} \times 16 \text{ feet})$$

$$A = 184 \text{ square feet}$$

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers

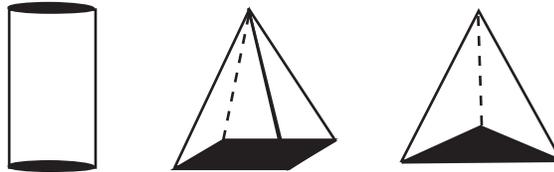
- 2.1 A room measures 58 ft. long by 26 ft. wide. What is the area of the room in square feet?
- 2.2 A room measures 48 ft. wide by  $37\frac{1}{2}$  ft. long. What is the area of the room in square yards?
- 2.3 A parking lot measures 100 m by 95 m. What is the area of the lot in square metres?
- 2.4 The price of snow clearing is based on area to be cleared. The contractor you have hired charges 9 cents per square feet. What will be the cost of clearing the snow from the lot mentioned in problem 2.3?

## Skill 3: Calculate the Volume of a Prism

TELL  
ME



**Volume** is the measure of the amount of space occupied by a 3-dimensional shape.



To calculate volumes of any prism, you can do the following:

### Method 1

1. Calculate the area of the base of a 3-dimensional shape ( $b$ ).
2. Multiply the result from the above by the measurement of the height of the 3D shape ( $h$ ).

### Method 2

Multiply length by width by height.

## SOMETHING TO CONSIDER

The units of volume are called "cubic units". Examples of units of volume are:

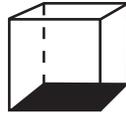
- Cubic feet ( $\text{ft}^3$ )
- Cubic metres ( $\text{m}^3$ )
- Cubic inches ( $\text{in}^3$ )
- Cubic yards ( $\text{yd}^3$ )
- Cubic centimetres ( $\text{cm}^3$ )

Cubic units can all be written as powers of 3, because they have three dimensions. For example, the volume of a prism measuring 5 m by 2 cm by 4 cm is  $40 \text{ cm}^3$ .

## SOMETHING TO CONSIDER

In the metric system, volume and capacity are the same thing. The litre is defined as one cubic-decimetre or a thousand cubic-centimetres ( $1000 \text{ cm}^3$ ). For example, a prism that measures 10 cm by 10 cm by 10 cm has a volume of  $1000 \text{ cm}^3$ . Since a litre is the same as  $1000 \text{ cm}^3$ , you can fill this prism with 1L of water.

SHOW  
ME

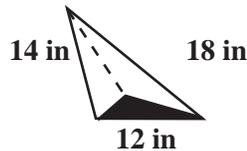


To find the volume of this box that is 3 m long by 2 m wide by 4 m high:

$$V = b \times h$$

$$V = 3 \text{ m} \times 2 \text{ m} \times 4 \text{ m}$$

$$V = 24 \text{ m}^3$$



First we have to find the area of the triangle that forms the base of this prism. The area of a triangle is  $\frac{1}{2}(b \times h)$  (base of the triangle times the height of the triangle).

### SOMETHING TO CONSIDER

Don't get the height of the triangle and the height of the prism mixed up.

The triangle has a base of 12 inches and a height of 14 inches. You substitute these values into the formula like this:

- Area of triangle =  $\frac{1}{2} (12 \text{ in} \times 14 \text{ in})$
- Area of triangle = 84 square inches for the area of the triangle

The height of the prism is 18 inches. You substitute the values into the volume formula like this:

- $V$  of the prism =  $b \times h$
- $V = 84 \text{ sq inches} \times 18 \text{ in}$
- $V = 1,512 \text{ cubic inches}$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 3.1 A parking lot measures 100 m by 95 m.
- What is the area of the lot in square metres?
  - How much concrete would be needed to pave the above lot with concrete 10 cm thick?
- 3.2 The aquarium at the Triple Z Casino holds 4,050 L. It measures 2.5 metres deep and 30 metres long. How wide is it?

# The Circle

TEACHING  
TIPS 2



**B**efore reviewing geometry skills related to circles, here are a few important definitions you should know.

**Circle:** An infinite set of points each of which is equally distant from a point called the centre.

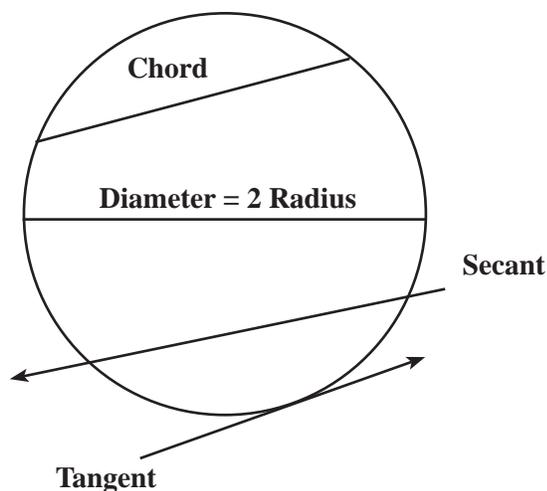
**Circumference:** The perimeter or length of a circle.

**Chord:** A line joining any two points of a circle.

**Diameter:** A chord passing through the centre of a circle. The length of the diameter is twice the length of the radius.

**Secant:** A line that intersects a circle in two points.

**Tangent:** A line that intersects a circle at one point.



## Skill 1:

# Calculate the Perimeter and Area of a Circle

TELL  
ME



Use the following formula to calculate:

|                       |  |
|-----------------------|--|
| Perimeter of a Circle | $2\pi r$ or $\pi d$ ( $2 \times$ 'pi' $\times$ radius or 'pi' $\times$ diameter) |
| Area of a circle      | $\pi r^2$ ('pi' $\times$ radius $\times$ radius)                                 |
| Volume of a sphere    | $\frac{4}{3}\pi r^3$ ( $\frac{4}{3} \times$ 'pi' radius to the power of 3)       |

## SOMETHING TO CONSIDER

When the length of any circle is divided by its diameter, the resulting number is 'pi' or 3.142. The symbol for pi is  $\pi$ . It is an irrational number and cannot be written as a fraction.

SHOW  
ME



You need to make a border for a circular table at the casino. The table has a radius of 30 inches. To find the length of the border of the table, you must calculate the perimeter like this:

$$\text{Perimeter of table} = 2\pi r \text{ or } \pi d \quad (2 \times \text{'pi'} \times \text{radius or 'pi'} \times \text{diameter})$$

$$P = 2 \times 3.14 \times 30 \text{ in}$$

$$P = 188.4 \text{ square inches}$$

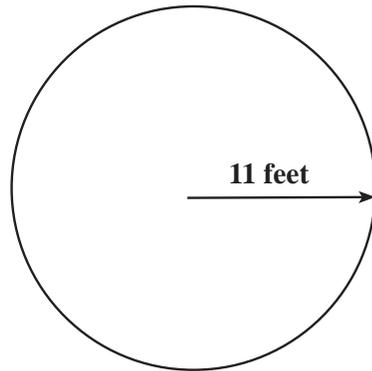
A dining room table has a diameter of 40 inches, so its radius is 20 inches. You can find its area like this:

$$\text{Area of table} = \pi \times r^2$$

$$A = 3.14 \times (20 \text{ in})^2$$

$$A = 3.14 \times 400 \text{ square inches}$$

$$A = 1,256 \text{ square inches}$$



We will find the volume of this large sphere, with a radius of 11 feet. Notice that the radius is the only dimension we need in order to calculate the volume of a sphere.

If we substitute 11 feet for the radius in the formula,

$$V = \frac{4}{3} \times \pi \times r^3$$

$$V = \frac{4}{3} \times 3.14 \times (11 \text{ feet})^3$$

$$V = \frac{4}{3} \times 3.14 \times 1,331 \text{ cubic feet.}$$

$$V = 5,572.45 \text{ cubic feet}$$

**LET ME  
TRY**



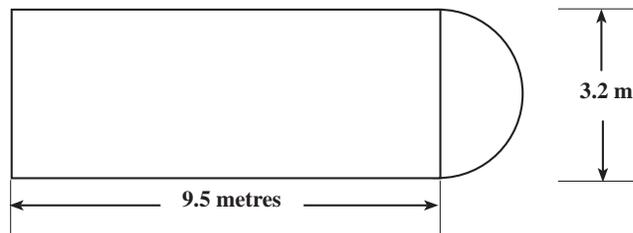
Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 1.1 You need to order enough material to cover the round tables in the dining room. Each table has a radius of 75 cm. What is the area of the surface of one table?
- 1.2 A circular fountain in the casino has an area of 50 square metres. What is the radius of this fountain?
- 1.3 The perimeter of a gaming table is 10 metres. What is the radius of the table?

# Challenge my skills

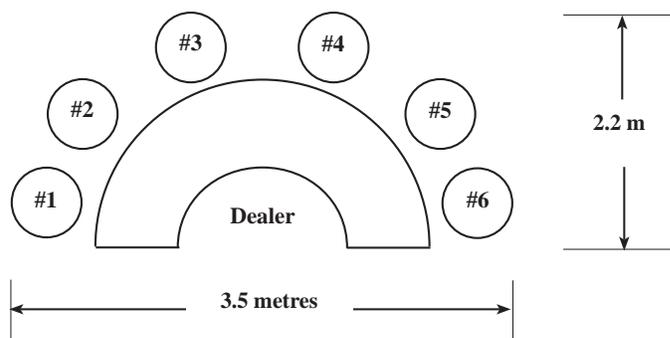
Challenge your geometry skills using these multi-skill practice activities. See Check My Answers at the end of the section for the correct answers.

1. What is the area of the room that is shown in the diagram below?



2. You will be installing ceramic tiles as baseboard in this room. Each tile measures  $30 \text{ cm}^2$ . How many will you need to put a 30 cm baseboard around the entire room, excluding a 1 metre wide door?
3. You are responsible for setting up a new room for blackjack tables. Each table will seat 6 players. You have drawn the diagram shown below that estimates the space that will be needed to accommodate the table, the dealer and the clients.

Assume that you must have at least 1.8 metres between tables to allow for client traffic. How many of these tables can you set up in a room that is 10 metres wide by 14 metres long? (Hint: You may find it helpful to draw a diagram.)



4. What is the volume of air in a room 10 metres long, 6.5 metres wide, and has ceilings at a height of 2.85 metres?
5. The volume of a cylinder equals the area of the circular base  $\times$  height. The formula for this is  $V = \pi r^2(h)$ . Calculate the volume of a hot water tank that has a radius of 14" and stands 4 feet tall. (Assume that 1 cubic foot = 1 gallon.)



**C**ompare your answers for Let Me Try activities and Challenge My Skills activities above. If you have less than half the answers correct, review the material and try the activities again.

### Skill 1: Calculate Perimeter

- 1.1 The perimeter is 1,200 metres (or 1.2 kilometres).
- 1.2 The perimeter of the fountain is 55 feet.
- 1.3 The perimeter of each table is 7 metres.

### Skill 2: Calculate Area

- 2.1 1,508 sq. ft.
- 2.2 200 sq. yd.
- 2.3 9,500 m<sup>2</sup>
- 2.4 103,455 square feet @ \$0.09 per square foot = \$9,310.95

### Skill 3: Calculate the Volume of a Prism

- 3.1
  - a) 9,500 m<sup>2</sup>
  - b) 950 m<sup>3</sup>

- 3.2 54 m

### Skill 4: Calculate the Perimeter and Area of a Circle

- 1.1 The area of the surface of one table is 17,662.5 cm<sup>2</sup>.
- 1.2 The radius of the fountain is:  $\sqrt{50 \div 3.14} = 3.99$  m.
- 1.3 The radius of the table is 1.59 m.

## Challenge My Skills

1.  $A = 9.5 \times 3.2 + \frac{1}{2}(1.6 \times 1.6 \times 3.14) = 30.4 + 4.02 = 34.42$  metres squared
2.  $P = 22.2 + 4.02 = 26.22$  m  $\div$  0.3 m per tile = 87.4 tiles or 88 tiles needed
3. Each table requires 3.5 m + 0.9 metres space (long) and 2.2 m + 0.9 m space (wide). Each table requires 4.4 m  $\times$  3.1 m of space. In a room 14 m  $\times$  10 m, you can place 3 tables along the length of the room and 3 tables across the width. Therefore, you can place 9 tables in the room.
4.  $V = 10 \times 6.5 \times 2.85 = 185.25$  m<sup>3</sup>
5. 17.19 gallons

## Foundation Section

# Metric and Imperial





# Teaching Tips

---

## Teaching Tip 1

Show how to convert Imperial and Metric systems by using this example:

You have this recipe sent to you by a friend in the U.S. The recipe is in the Imperial system. Convert the recipe to metric values, guaranteeing that the cookies would taste as delicious in Canada as in the United States.

- 1 1/4 cups flour
- 1 tsp. baking soda
- 1/2 cup white sugar
- 1 egg
- 1/2 cup butter
- 3/4 cup chocolate chips or nuts

# Introduction

**G**aming industry workers need to understand the metric and imperial systems of measurement to do their jobs. They also need to know how to convert from one system to the other.

For example, you would use these systems to:

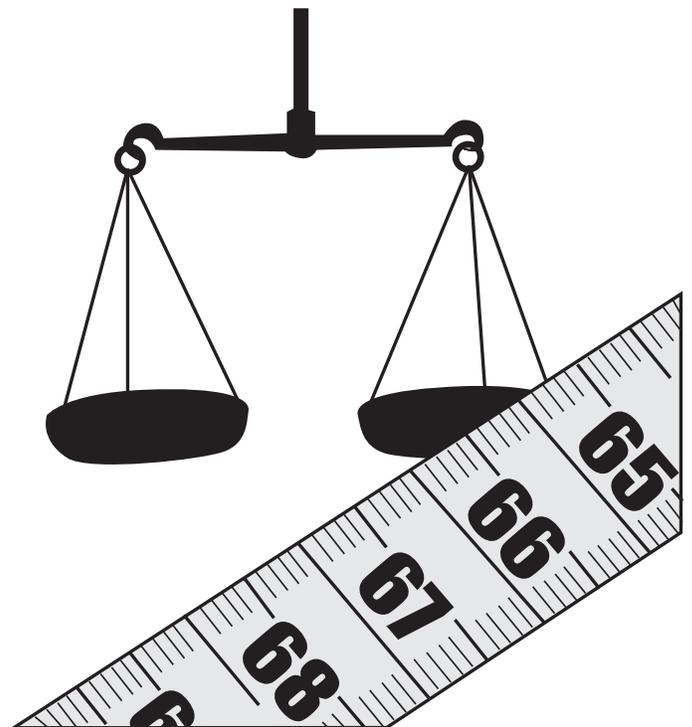
- Convert the amount of meat for a recipe from pounds to kilograms
- Calculate the amount of paint needed for a maintenance job
- Measure the amount of cloth needed to make drapes for the casino
- Convert a drink recipe from the Imperial to the metric system

In this section, you will learn how to:

- Identify Common Base Units, Prefixes and Symbols Used in the Metric System
- Convert Units within the Metric System
- Identify Imperial System Units and Symbols, and Convert Units within the System
- Convert from Metric Units to Imperial Units
- Convert from Imperial Units to Metric Units

Some jobs that need Metric and Imperial System skills

Bank Supervisor  
Bartender  
Dealer  
Dining Room Supervisor  
Guest Services Supervisor  
Investigative Security Officer  
Kitchen Helper  
Receiver  
Server  
Shuttle Bus Driver  
Slot Attendant  
Surveillance Technician  
Technical Support Supervisor  
Warehouse Clerk  
Warehouse Supervisor



# Metric System

The metric system is a decimal system of measurement used in most parts of the world. The metric system, or the *Système Internationale d'Unités* (S.I.), is the only internationally recognized metric system in the world. It became the world standard of measurement in 1960.

The metric system became legal in Canada in 1873, but was not widely used in this country until the 1970's.

## Skill 1: Identify Common Base Units, Prefixes and Symbols Used in the Metric System

TELL  
ME



### Common Base Units

In the metric system, units for all quantities used in science, technology and everyday life are based on seven base units (BU's). In comparison, the imperial system has 53 base units that follow no particular pattern.

The following chart outlines the most common base units used in the *Système Internationale d'Unités* (S.I.), or the metric system.

| Quantity Measured                        | Base Unit (BU)  | Symbol    |
|--|-----------------|-----------|
| Length, width, distance, thickness, etc. | metre           | m         |
| Mass (weight)                            | gram            | g         |
| Time                                     | second          | s         |
| Volume                                   | litre           | L         |
| Temperature                              | degrees Celsius | degrees C |
| Electric current                         | ampere          | A         |

## Prefixes

The metric system uses only one set of prefixes. The prefixes are Greek and Latin and represent numerical values. For example, “centi” means hundredth (0.01), so centimetre means 0.01, or one hundredth of a metre. Metric symbols and their values mean the same all over the world, so whether you’re in China, Chiswick or Corfu, 500 mg means 500 mg!

The following chart shows the metric prefixes and their meaning:

| Multiples               |                        |                       |            | Submultiples           |                         |                          |
|-------------------------|------------------------|-----------------------|------------|------------------------|-------------------------|--------------------------|
| kilo-                   | hecto-                 | deca-                 | Basic Unit | deci-                  | centi-                  | milli-                   |
| $1000 \times \text{BU}$ | $100 \times \text{BU}$ | $10 \times \text{BU}$ | BU         | $0.1 \times \text{BU}$ | $0.01 \times \text{BU}$ | $0.001 \times \text{BU}$ |

## SOMETHING TO CONSIDER

In the metric system, the base unit appears in multiples (larger units) and submultiples (smaller units). For instance the base unit litre appears in kilolitre (multiple) and centilitre (submultiple). The multiple is larger than the base unit. The submultiple is smaller than the base unit.



## Length, Width, Distance and Thickness

The metre is the base unit used to measure length, width, distance and thickness. The other units used to measure these quantities include:

| kilometre        | hectometre      | decametre      | metre         | decimetre       | centimetre       | millimetre        |
|------------------|-----------------|----------------|---------------|-----------------|------------------|-------------------|
| km               | hm              | dam            | m             | dm              | cm               | mm                |
| $1000 \text{ m}$ | $100 \text{ m}$ | $10 \text{ m}$ | $1 \text{ m}$ | $0.1 \text{ m}$ | $0.01 \text{ m}$ | $0.001 \text{ m}$ |

In our daily lives, the kilometre, metre, centimetre and millimetre are the most common units used to measure distance, length, width and thickness.

For example, we measure:

- distance from one city to another in kilometres
- length of cloth for sewing in metres
- babies’ height in centimetres
- the width of microscopic organisms in millimetres

## Mass (Weight)

The gram is the base unit for measuring mass. Other units include:

| Kilogram | Hectogram | Decagram | gram | decigram | centigram | milligram |
|----------|-----------|----------|------|----------|-----------|-----------|
| Kg       | Hg        | dag      | g    | dg       | cg        | mg        |
| 1000 g   | 100 g     | 10 g     | 1 g  | 0.1 g    | 0.01 g    | 0.001 g   |

Gram, milligram, and kilogram are the most common units used to measure mass.

For example, we measure:

- a small dose of medicine in milligrams
- fat content in a food item in grams
- a beef roast in kilograms

## Volume

The litre is the base unit used to measure volume. Other units used include:

| Kilolitre | hectolitre | Decalitre | litre | decilitre | centilitre | millilitre |
|-----------|------------|-----------|-------|-----------|------------|------------|
| Kl        | Hl         | Dal       | L     | dl        | cl         | ml         |
| 1000 L    | 100 L      | 10 L      | 1 L   | 0.1 L     | 0.01 L     | 0.001 L    |

Litre, millilitre and kilolitre are the most common metric units used to measure volume.

For example, we measure:

- drops of medicine in millilitres
- milk in litres
- large amounts of water in kilolitres

**LET ME  
TRY**



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 1.1 The standard unit of length in the metric system is the \_\_\_\_\_
- 1.2 The standard unit of volume in the S.I. is the \_\_\_\_\_
- 1.3 The kilogram is a metric unit of \_\_\_\_\_
- 1.4 The degree Celsius is the metric unit of \_\_\_\_\_
- 1.5 The standard unit of time in the metric system is the \_\_\_\_\_
- 1.6 0.01 is the value of the prefix \_\_\_\_\_
- 1.7 The symbol for the hectolitre is \_\_\_\_\_
- 1.8 The prefix deca means \_\_\_\_\_ in the metric system.
- 1.9 k is the symbol for \_\_\_\_\_ in the S.I.
- 1.10 The standard unit of electrical current in the S.I. is the \_\_\_\_\_

## Skill 2: Convert Units within the Metric System

TEACHING  
TIPS 1



TELL  
ME



The units in the metric system are based on multiples and submultiples of ten. The change from one unit to another simply involves moving the decimal point a specified number of places either left or right.

To move from a unit to a larger unit:

- Divide by ten, one hundred or one thousand depending how many places you need to move the decimal place.

To move from a unit to a smaller unit:

- Multiply by ten, one hundred or one thousand depending how many places you need to move the decimal place

|                         |  |
|-------------------------|--|
| Multiplying by TEN      | Move the decimal place 1 PLACE to the RIGHT  |
| Multiplying by HUNDRED  | Move the decimal point 2 PLACES to the RIGHT |
| Multiplying by THOUSAND | Move the decimal point 3 PLACES to the RIGHT |
| Dividing by TEN         | Move the decimal point 1 PLACE to the LEFT   |
| Dividing by HUNDRED     | Move the decimal point 2 PLACES to the LEFT  |
| Dividing by THOUSAND    | Move the decimal point 3 PLACES to the LEFT  |



### To convert 50 g to kg:

- Divide because you are moving from a smaller unit to a larger one.
- Move three steps from the original unit (g) to the required unit (kg): From g to da to hecto to kilo.
- Since each step has a value of 10, ( $10 \times 10 \times 10$ ), divide the unit by the number of steps, i.e., 50 divided by 1000 = 0.050 kg (move the decimal point three places to the left).

### To convert 50 g to mg:

- Divide as you will move from one unit to a smaller unit.
- Move three steps from the original unit (g) to the required unit (mg): g to deci to centi to kilo.
- Since each step has a value of 10, ( $10 \times 10 \times 10$ ), multiply the unit by the number of steps, i.e., 50 multiplied by 1000 = 50,000 mg (move the decimal point 3 places to the right).

## LET ME TRY



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 2.1 Change 30 g to kilograms.
- 2.2 How many litres are there in 8000 cl?
- 2.3 Change 12.1 hectolitres to centilitres.
- 2.4 Change 90 kilograms to grams.
- 2.5 Change 12 L to kL.

# English (Imperial) System

Before adopting the metric system, Canada used the Imperial system, and also some of the French system. The Imperial system was first used in science in 1838. But some imperial units such as the foot and mile were used as long ago as the Roman Empire. In 1873, Canada made the metric system legal. However, many people still use Imperial measurements in daily life, such as pounds, miles and quarts.

## Skill 1: Identify Imperial System Units and Symbols, and Convert Units within the System

TELL  
ME



The following is a list of some of the common units in the Imperial System.

| Quantity Being Measured | Unit   | Symbol or Abbreviation | Equivalencies Between Units           |
|-------------------------|--------|------------------------|---------------------------------------|
| Length                  | Inch   | " or in.               |                                       |
|                         | Foot   | ' or ft.               | 1 foot = 12 inches (in.)              |
|                         | Yard   | yd.                    | 1 yard = 3 feet                       |
| Weight (Mass)           | Ounce  | oz.                    |                                       |
|                         | Pound  | lb.                    | 1 pound = 16 ounces                   |
|                         | Ton    | t.                     | 1 ton = 2,000 lb.                     |
| Volume                  | Cup    | c.                     | 1 cup (c.) = 8 fluid ounces (fl. oz.) |
|                         | Pint   | pt.                    | 1 pint = 2 cups                       |
|                         | Quart  | qt.                    | 1 quart = 2 pints                     |
|                         | Gallon | gal.                   | 1 gallon = 4 quarts                   |
| Time                    | Second | s.                     |                                       |
|                         | Minute | min.                   | 1 minute = 60 seconds                 |
|                         | Hour   | hr.                    | 1 hour = 60 minutes                   |
|                         | Day    | d.                     | 1 day = 24 hours                      |
|                         | Week   | wk.                    | 1 week = 7 days                       |
|                         | Month  | m.                     | 1 month = 4 weeks                     |
|                         | Year   | yr.                    | 1 year = 12 months or 365 days        |

**SHOW  
ME**



**To find out how many days are in five weeks:**

–  $5 \text{ (weeks)} \times 7 \text{ (days per week)} = 35 \text{ days}$

**To find out how many minutes are in one day:**

–  $24 \text{ (hours in one day)} \times 60 \text{ (minutes per hour)} = 1,440 \text{ minutes}$

**To find out how many feet are in five yards:**

–  $5 \times 3 \text{ (feet per yard)} = 15 \text{ feet}$

**To find out how many cups are in 3 quarts:**

– First find how many cups in a quart:

2 pints per quart and 2 cups per pint, so one quart =  $2 \times 2 = 4$  cups per quart.

– Next calculate how many cups are in three quarts:

$3 \text{ (quarts)} \times 4 \text{ (cups per quart)} = 12 \text{ cups}$

**LET ME  
TRY**



Now it's your turn. Try this practice activity to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

1.1 How many pounds are in a ton?

1.2 How many cups are in a gallon?

1.3 How many minutes are in one day?

1.4 How many minutes are in the month of March?

1.5 If a mile is 1,760 yards, how many feet are in a mile? How many inches are in a mile?

## Skill 2:

# Convert from Metric Units to Imperial Units

TELL  
ME



Follow the directions in this table to convert from metric units to Imperial units.

| Dimension     | When You Know         | Multiply By                          | To Find                |
|---------------|-----------------------|--------------------------------------|------------------------|
| Length        | millimetres (mm)      | 0.04                                 | inches (in.)           |
|               | centimetres (cm)      | 0.4                                  | inches (in.)           |
|               | metres (m)            | 3.3                                  | feet (ft.)             |
|               | kilometres (km)       | 0.6                                  | miles                  |
| Mass (weight) | grams (g)             | 0.035                                | ounces (oz.)           |
|               | kilograms (kg)        | 2.2                                  | pounds (lb.)           |
|               | tonnes (1,000 kg) (t) | 1.1                                  | short tons (2,000 lb.) |
| Volume        | millilitres           | 0.03                                 | fluid ounces (fl. oz.) |
|               | litres                | 0.26                                 | gallons (gal)          |
| Temperature   | degrees Celsius       | $\frac{9}{5}(\text{degrees C}) + 32$ | degrees Fahrenheit     |

SHOW  
ME



To convert 20 degrees Celsius to degrees Fahrenheit,

$$\frac{9}{5} \times (\text{degrees C}) + 32 = \text{Fahrenheit } (F)$$

$$\frac{9}{5} \times 20 + 32 = F$$

$$36 + 32 = F$$

$$68 = F$$

To convert 10 grams to ounces, follow this formula:

- Multiply the amount of grams by 0.035  
 $10 \times 0.035 = 0.35$  ounces

**To convert 10 metres to feet, follow this formula:**

- Multiply the number of metres by 3.3  
 $10 \times 3.3 = 33$  feet

**LET ME  
TRY**



Now it's your turn. Try this practice activity to see how well you understand this skill. See Check My Answers at the end of the section for the correct answers.

- 2.1 The distance from the Triple Z Company office to the casino is 17.3 km. How many miles is this?
- 2.2 A casino guest has heard the temperature is  $-20$  Celsius. He asks you what this is in Fahrenheit. What do you tell him?
- 2.3 You are using a recipe that requires 5 kg of beef. How many pounds of beef must you buy to make this recipe?
- 2.4 A mixed drink calls for 50 ml. of rum. How many ounces is this?
- 2.5 The ceiling in the dining room is six metres high. How many feet is this?

## Convert from Imperial Units to Metric

## Skill 3: Units

TELL  
ME



To convert from Imperial units to metric units:

| Dimension     | When You Know         | Multiply By                           | To Find                |
|---------------|-----------------------|---------------------------------------|------------------------|
| Length        | inches                | 25.4                                  | millimetres            |
|               | inches                | 2.54                                  | centimetres            |
|               | feet                  | 30                                    | centimetres            |
|               | miles                 | 1.6                                   | kilometres             |
|               |                       |                                       |                        |
| Mass (weight) | tonnes (1,000 kg) (t) | 1.1                                   | short tons (2,000 lb.) |
|               | ounces                | 28                                    | grams                  |
|               | pounds                | 0.45                                  | kilograms              |
|               | short tons            | 0.9                                   | tonnes                 |
| Volume        | fluid ounces          | 30                                    | millilitres            |
|               | cups                  | 0.24                                  | litres                 |
|               | gallons               | 3.8                                   | litres                 |
| Temperature   |                       |                                       |                        |
|               | degrees Fahrenheit    | $\frac{5}{9} (\text{degrees F}) - 32$ | degrees Celsius        |

SHOW  
ME



To convert 70 degrees Fahrenheit to degrees Celsius:

- Subtract 32 from the number of degrees Fahrenheit:  $70 - 32 = 38$
- Take this new number and follow this formula:

$$\frac{5 \times 38}{9} = \frac{190}{9} = 21.1 \text{ degrees Celsius}$$

To convert 8 inches to centimetres:

- Multiply the number of inches by 2.54  
 $8 \times 2.54 = 20.32 \text{ cm}$

**To convert 4 gallons to litres:**

- Multiply the number of gallons by 3.8  
 $4 \times 3.8 = 15.2 \text{ litres}$

**LET ME  
TRY**



- 3.1 The facility technician, when reviewing blueprints for the new system, noted that the tolerance for the holes for the stabilizing bolts was 2.35 millimetres. Convert this tolerance to centimetres and to inches.
- 3.2 The facilities supervisor, when reviewing the construction plans for a new building, sees that the steel reinforcing bar is 6.87 feet long. Convert this length to metres and centimetres.
- 3.3 The facilities supervisor, when reviewing the construction plans for a new building, notes the width of the steel beam as 4.56 inches. Convert this blueprint information to metres and centimetres.
- 3.4 The average weight of a pallet of photocopying paper is 640 pounds. How many kilograms does it weigh?
- 3.5 The heating system broke down and the average air temperature inside the casino is 64 degrees Fahrenheit. What is the temperature in degrees Celsius?



**C**ompare your answers for Let Me Try activities below. If you have gotten less than half the answers correct, review the material and try the activities again.

## Metric

### Skill 1: Identify Common Base Units, Prefixes and Symbols Used in the Metric System

- 1.1 metre
- 1.2 litre (The terms S.I. and “metric system” can be used interchangeably.)
- 1.3 weight (mass)
- 1.4 temperature
- 1.5 second
- 1.6 centi
- 1.7 hL
- 1.8 ten
- 1.9 1,000 (The terms S.I. and “metric system” can be used interchangeably.)
- 1.10 amp(ere) (The terms S.I. and “metric system” can be used interchangeably.)

### Skill 2: Convert Units within the Metric System

- 2.1 0.03 kg
- 2.2 80 L
- 2.3 121,000 L
- 2.4 90,000 g
- 2.5 0.012 kL

# English (Imperial) System

## Skill 1: Identify Imperial System Units and Symbols, and Convert Units within the System

1.1 2,000 pounds

1.2 16 cups

1.3 1,440 minutes

1.4 44,640 minutes

1.5 5,280 feet and 63,360 inches

## Skill 2: Convert from Metric Units to Imperial Units

2.1  $17.3 \times 0.6 = 10.38$  miles

2.2  $-4^{\circ}$  F

2.3 11 lb.

2.4 1.5 oz.

2.5 19.8 feet

## Skill 3: Convert from Imperial unit to Metric Unit

3.1  $0.235 \text{ cm} \times 0.4 = 0.094 \text{ in.}$

3.2  $6.87 \times 30 = 206.1 \text{ cm} = 2.061 \text{ m}$

3.3  $4.56 \times 2.54 = 11.5824 \text{ cms}/100 = 0.115824 \text{ m}$

3.4  $640 \times 0.45 = 288 \text{ kg}$

3.5  $64 - 32 = 32; 5 \times 32 / 9 = 17.7 \text{ degrees C}$

# Foundation Section

## Military Time: The 24-Hour Clock

No Parking  
15:30 to 17:30

24

18

Your coffee breaks  
are scheduled...

12

# Introduction

**A**s you know, a day has 24 hours. In day-to-day life, we mark off the time of day with two 12-hour cycles.

- From noon until midnight is referred to as **p.m.** time.
- From midnight until noon is referred to as **a.m.** time.
- 12:00 noon is 12:00 p.m. 12:00 midnight is 12:00 a.m.

In most cases, this way of labelling and tracking time works well. We understand that 8:30 a.m. means the same thing as “half past 8 in the morning” or “8:30 in the morning”. This can be confusing when the work schedule covers day, evening, and night hours. If someone tells you to come in at 7:00, the meaning is not clear. You have to ask, “Is that the morning or the evening?”

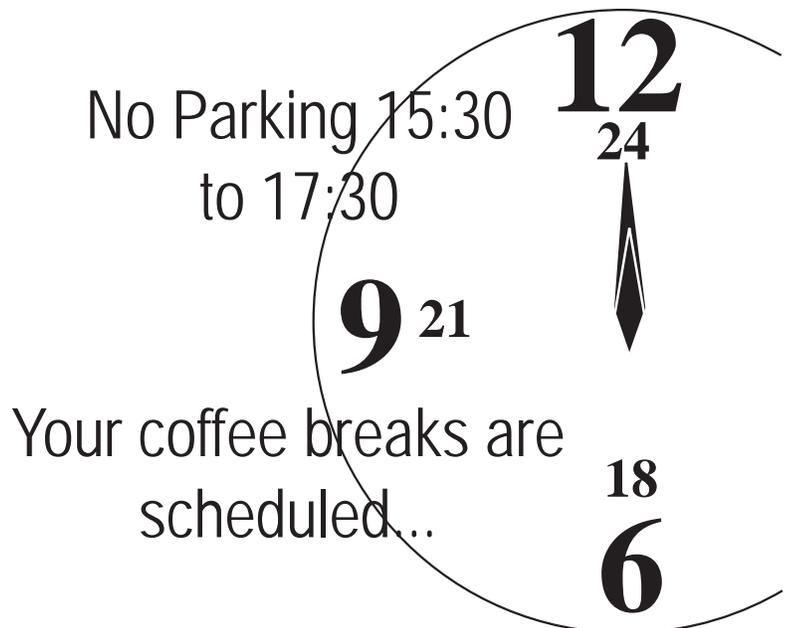
To eliminate this confusion, some workplaces, such as casinos, hospitals, the military and transit/airline organizations use the 24-hour clock to label time.

In this section you will learn how to:

- Read the Twenty-Four Hour Clock or Military Time
- Convert 12-Hour Time to Military Time

Some jobs that need  
Military Time skills

Bank Supervisor  
Banquet Supervisor  
Bartender  
Bingo Volunteer Coordinator  
BVK Supervisor  
Casino Bank Cashier  
Chef  
Cook  
Department Manager  
Facilities Supervisor  
Facility Technician  
Guest Services Supervisor  
Hostess  
Housekeeping Attendant  
Housekeeping Supervisor  
Maintenance Technician  
Retail Supervisor  
Security Officer  
Security Supervisor  
Senior Cashier  
Senior Clerk Typist  
Server  
Shuttle Bus Driver  
Slot Attendant  
Slot Floor Supervisor  
Surveillance Technician  
Switchboard Operator  
Tables Game Inspector  
Valet Attendant  
Warehouse Supervisor



# Skill 1: Read the 24-Hour Clock or Military Time

TELL  
ME



The 24-hour clock or **Military Time** marks a **24-hour cycle** from **midnight to midnight**.

- This system uses four-digit numbers to label each minute of each 24-hour cycle.
- The first two digits refer to the hour, and the third and fourth digits refer to the minute past the hour.
- Midnight is zero hours.

SHOW  
ME



8:15 a.m.

0815 hours or 08:15

**Military time always designates a time with 4 digits. The first and second digits represent the hour, and the third and fourth digits represent the minutes past the hour.**

| 24-hour Clock Time  | 12-Hour Clock Time                |
|---------------------|-----------------------------------|
| 0000 hours or 00:00 | Midnight                          |
| 0001 hours or 00:01 | One minute past midnight          |
| 0800 hours or 08:00 | 8:00 a.m. (8:00 in the morning)   |
| 1030 hours or 10:30 | 10:30 a.m. (10:30 in the morning) |
| 1400 hours or 14:00 | 2:00 p.m. (2:00 in the afternoon) |
| 1845 hours or 18:45 | 6:45 p.m. (6:45 in the evening)   |
| 2300 hours or 23:00 | 11:00 p.m. (11:00 at night)       |

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers

- 1.1 Give the 12-hour clock time for each of the following military times:
  - a) 13:35
  - b) 0735 hours
  - c) 15:05
  - d) 1945 hours
  - e) 0400 hours
  - f) 12:00
  - g) 0100 hours
- 1.2 You must begin work at 1800 hours today. What time is this on the 12-hour clock?
- 1.3 Your shift tomorrow is from 0000 to 0800. What are these times on the 12-hour clock?

## Skill 2: Convert 12-Hour Time to Military Time

TELL  
ME



To convert 12-hour time to military time, use the following method:

For **a.m.** times:

- Use the **same numbers** you use for **12-hour time** to show the military time. Remember that all **military time** must be shown with **four digits**.

For **p.m.** times:

- **Add 12** to the **number** of hours **in 12-hour time**.

For a.m. times:

| 24-hour Clock Time                                   | 12-Hour Clock Time  |
|--|---------------------|
| 4:20 a.m. (twenty minutes after 4:00 in the morning) | 0420 hours or 04:20 |
| 11:45 a.m. (a quarter to 12 noon)                    | 1145 hours or 11:45 |
| 8:30 a.m. (half past 8 in the morning)               | 0830 hours or 08:30 |

### SOMETHING TO CONSIDER

When you see the four-digit number to designate time, you know that the 24-hour clock is being used. 0800 hours or 08:00 will always mean 8:00 in the morning or 8 hours after midnight.

For p.m. times:

| 24-hour Clock Time | Add 12 to the 12-hour time | 24-Hour Clock Time  |
|--------------------|----------------------------|---------------------|
| 2:00 p.m.          | $2 + 12 = 14$              | 1400 hours or 14:00 |
| 10:45 p.m.         | $10 + 12 = 22$             | 2245 hours or 22:45 |
| 6:00 p.m.          | $6 + 12 = 18$              | 1800 hours or 18:00 |

### SOMETHING TO CONSIDER

When you see times using numbers greater than 12 to designate the hour, you know that the 24-hour clock is being used. 2130 hours or 21:30 will always mean 9:30 in the evening or 21 hours and 30 minutes after midnight.

Something To Consider

The signs that indicate parking restrictions show military times.

“No Parking 15:30 to 17:30”

This means parking is not permitted between 3:30 p.m. and 5:30 p.m. Anyone who has had a car towed from a restricted parking zone has had an expensive lesson about the 24-hour clock.

Now it’s your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers



- 2.1 Give the military time for each of the following 12-hour times:
- a) 8:30 a.m.
  - b) 10:45 a.m.
  - c) noon
  - d) a quarter past 9 in the morning
  - e) 5 minutes to midnight
  - f) 20 minutes after 5 in the afternoon
  - g) 4:30 p.m.
  - h) 10:00 p.m.
  - i) half-past noon
  - j) one minute after midnight
- 2.2 Give the 12-hour clock time for each of the following 24-hour clock times:
- a) 0530
  - b) 0310
  - c) 0255
  - d) 0945
  - e) 0800
  - f) 1235
  - g) 1510
  - h) 2015
  - i) 1840
  - j) 1530
  - k) 2345
- 2.3 If your regular shift is 0600 – 1500, 5 days per week, with 1 hour unpaid break each day, how many hours per day will you be paid for? How many hours per week?
- 2.4 It is 5:15 p.m. and you are looking for a parking spot. Can you park in a spot that is marked “No Parking 1530 – 1750 Mon-Fri?”
- 2.5 Your coffee breaks are scheduled from 1130 – 1145, and 1630 – 1645. Give these times in 12-hour cycle terms.



**C**ompare your answers for Let Me Try activities below. If you have less than half the answers correct, review the material and try the activities again.

## **Skill 1: Read 24-Hour Clock or Military Time**

1.1

- a) 1:35 p.m. or 1:35 in the afternoon
- b) 7:35 a.m. or 7:35 in the morning
- c) 3:05 p.m. or 3:05 in the afternoon
- d) 7:45 p.m. or 7:45 in the evening
- e) 4:00 a.m. or 4 in the morning
- f) 12:00 p.m. or noon
- g) 1:00 a.m. or 1 in the morning

1.2 6:00 p.m.

1.3 12.00 a.m. to 8:00 a.m.

## **Skill 2: Convert 12-Hour Time to Military Time**

2.1

- a) 0830
- b) 1045
- c) 1200
- d) 0915
- e) 2355
- f) 1720
- g) 1630
- h) 2200
- i) 1230
- j) 0001

2.2

- a) 5:30 a.m.
- b) 3:10 a.m.
- c) 2:55 a.m.
- d) 9:45 a.m.
- e) 8:00 a.m.
- f) 35 minutes past noon or 25 minutes to 1:00 p.m.
- g) 10 minutes after 3:00 p.m.
- h) 8:15 p.m.
- i) 6:40 p.m.
- j) 3:30 p.m.
- k) 11:45 p.m.

2.3 8 hours per day; 40 hours per week

2.4 No

2.5 11:30 – 11:45 a.m. and 4:30 – 4:45 p.m.

# Foundation Section

## Percentages





# Teaching Tips

---

**S**ome people think that a percentage increase can be “reversed” by the same percentage decrease. But no!

For example, a 10% increase from 100 is an **increase of 10**, which equals 110 ... but a 10% reduction from 110 is a **reduction of 11** (10% of 110 is 11), which equals **99** because a percentage is always **in relation to the old value**. The 10% increase was applied to **100**. But the 10% decrease was applied to **110** and not the 100 we started with.

Ask learners to calculate this:

In your retail store, you have an item on sale for \$6.99. The original price was \$10.00. What was the percentage discount? (30%)

What would the price be if you raised the \$6.99 by that same percentage? (\$9.10)

# Introduction

**G**aming industry workers often use percentages in their work. For example, food and beverage workers calculate GST, PST and tips by using percentages. People who buy supplies use percentages when researching discounts on prices. Casino workers at the blackjack tables use percentages when the house plays 150% of a bet and the player wins. Workers responsible for budgets use percentages to see how budgets have increased or decreased. Supervisors and managers use percentages when working on payroll deductions.

In this section, you will learn how to:

- Convert a Percentage to a Fraction and Fraction to a Percentage
- Convert a Percentage to a Decimal and Decimal to a Percentage
- Find the Percentage of a Number using a Proportion
- Find the Percentage of a Number in One Step
- Calculate More than One Percentage
- Calculate Discounts
- Calculate Multiple Discounts
- Determine Percentage

## Some jobs that need Percentages skills

Animatronics Operator  
Bank Supervisor  
Banquet Supervisor  
Bartender  
Bingo Volunteer Coordinator  
Bingo/Keno Cashier  
Bingo/Keno/Video (BKV) Attendant  
(Caller / Checker)  
BVK Supervisor  
Casino Bank Cashier  
Cook  
Chef  
Department Manager  
Dining Room Supervisor  
Facility Technician  
Facilities Supervisory  
Guest Services Representative  
Guest Services Supervisor  
Hostess/Host  
Housekeeping Attendant  
Housekeeping Supervisor  
Investigative Security Officer  
Maintenance Technician  
Retail Cashier  
Retail Supervisory  
Security Officer  
Security Supervisor  
Senior Cashier  
Senior Clerk Typist  
Server  
Shuttle Bus Driver  
Slot Attendant  
Slot Floor Supervisor  
Surveillance Technician  
Switchboard Operator  
Table Games Inspector  
Technical Support Supervisor  
Uniforms Technician  
Uniforms Supervisor  
Valet Attendant  
Warehouse Clerk  
Warehouse Supervisor





# Percentage

In math terms, a percentage (%) is a ratio whose second term is 100. “Percent” means parts per hundred or “out of 100”. We use the symbol “%” for percent.

A percentage can be written as a decimal and also as a fraction.

**96% is the same as 96 out of 100, 96:100, or 0.96**

## Skill 1:

## Convert a Percentage to a Fraction and Fraction to a Percentage

TELL  
ME



To **convert** a **percentage** to a **fraction**, follow these steps:

1. **Remove** the percentage sign.
2. **Make a fraction** with the **percentage** as the **numerator** and **100** as the **denominator**.
3. **Reduce** the fraction if needed.

To **convert** a **fraction** to a **percentage**, follow these steps:

1. **Divide** the **numerator** of the fraction by the **denominator**.
2. **Multiply by 100** (Move the decimal point two places to the right).
3. **Round** the **answer** to the desired precision.
4. **Follow** the answer **with** the **% sign**.

SHOW  
ME



To convert 86% to a fraction:

1. Remove the percentage sign: 86

2. Make a fraction with the percentage as a numerator and 100 as the denominator:  $\frac{86}{100}$

3. Reduce the fraction:  $\frac{86 \div 2}{100 \div 2} = \frac{43}{50}$

$$\text{So } 86\% = \frac{43}{50}$$

$\frac{4}{5}$

To convert  $\frac{4}{5}$  to a percentage:

1. Divide the numerator by the denominator:  $4 \div 5 = 0.80$
2. Multiply by 100:  $0.80 \times 100 = 80$
3. If necessary, round the answer to the desired precision. (In this case, 80 does not need to be rounded as it is a whole number.)
4. Add the % sign to the answer: 80%

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

1.1 Convert 28% to a fraction.

1.2 Six out of every nine guests in the casino one night were women. Calculate what percentage of the guests were women.

## Skill 2:

# Convert a Percentage to a Decimal and Decimal to a Percentage

TELL  
ME



To **convert a percentage to a decimal**, do the following:

1. **Divide** the percentage by 100.

To **convert a decimal to a percentage**, do the following:

1. **Multiply** the **decimal** by **100**.
2. **Add a percentage sign** after the **answer**.

SHOW  
ME



**To convert 83% to a decimal:**

1. Divide the percentage by 100:  $83 \div 100 = 0.83$

**To convert 0.83 to a percentage:**

1. Multiply the decimal by 100:  $0.83 \times 100 = 83$
2. Add a percentage sign after the answer: 83%

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 2.1 Convert 15% to a decimal.
- 2.2 Convert 0.73 to a percentage.

### Skill 3:

## Find the Percentage of a Number using a Proportion

TELL  
ME



To determine the **percentage** of a **number** in two steps, do the following:

1. Set up a **proportion** equating the **ratio** of the unknown part of the number to the **total** number given with the ratio of the percentage to 100.
2. **Cross-multiply**.
3. **Solve** the equation.

### SOMETHING TO CONSIDER

You need 3 of the 4 values in order to calculate the fourth. "100" will always appear in the lower right quadrant.

$$\frac{\text{Part}}{\text{Total}} = \frac{x}{100}$$

SHOW  
ME



To find the 6% GST on a sales total of \$45.75:

**Step 1. Set up the proportion:**

$$\begin{array}{rcc} \text{Part} & x & 6 \\ \hline \text{total} & \$45.75 & 100 \end{array} =$$

**Step 2. Cross multiply:  $100x = 6 \times \$45.75$**

**Step 3: Solve the equation:  $x = \frac{6 \times \$45.75}{100}$**

$$x = \frac{\$274.5}{100}$$

$$x = \$2.75$$

LET ME  
TRY



3.1 Find the 6% GST on a sales total of \$67.98.

3.2 Find the 6% GST on a sales total of \$35.50.

## Skill 4:

## Find the Percentage of a Number in One Step

TELL  
ME



To find the **percentage** of a **number**, do this one-step calculation:

1. **Convert** the **percentage** to a decimal number and **multiply** by the original amount.

## SHOW ME



To calculate 6% GST of an item that costs \$350.00:

Convert the percentage to a decimal number and multiply by the original amount.

$$\begin{array}{rcl} \$350.00 \times 0.06 & = & \text{Amount of tax} \\ \$21.00 & = & \text{Amount of tax} \end{array}$$

## SOMETHING TO CONSIDER

To find a new price, the taxes must be added to the original (before tax) price. The entire process for calculating tax and a tax-included price can be written in a single equation.

For example, the total price of an item that costs \$350.00 plus 7% PST may be written as:

$$\begin{array}{rcl} \$350.00 + (350.00 \times 0.07) & = & \text{Price including tax} \\ \$350.00 + 24.50 & = & \text{Price including tax} \\ \$374.50 & = & \text{Price including tax} \end{array}$$

Or:

$$\begin{array}{rcl} \$350.00 \times (100\% + 7\%) & = & \text{Price including tax} \\ \$350.00 \times (1 + 0.07) & = & \text{Price including tax} \\ \$350.00 \times 1.07 & = & \text{Price including tax} \\ \$374.50 & = & \text{Price including tax} \end{array}$$

## LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 4.1 A customer has a total bill of \$34.50. She asks you to calculate a 10% tip and include it with the cost of her food order. What is her total bill, including tip?
- 4.2 A customer wants to buy an item that costs \$225.50. What is the cost of this item including 6% GST?

## Skill 5: Calculate More than One Percentage

TELL  
ME



To calculate the total of all percentages to be included in a final price:

### Method 1

**Multiply the starting price by each one of the percentages and add the results plus the starting price.**

### Method 2

**Multiply the total percentage amount by the starting price.**

Note: This includes the percentage represented by the original price.

SHOW  
ME



To calculate the final cost of a bill for \$55.00 including 6% GST and 7% PST:

### Method 1:

$$\begin{aligned} \$55.00 + \$55.00 \times 6\% + \$55.00 \times 7\% &= \text{Total bill} \\ \$55.00 + \$3.30 + \$3.85 &= \text{Total bill} \\ \$62.15 &= \text{Total bill} \end{aligned}$$

### Method 2:

1. Multiply the total percentage amount by the starting price.

$$\begin{aligned} \$55.00 \times (100\% + 6\% + 7\%) &= \text{Total bill} \\ &\quad \swarrow \quad \searrow \\ &\quad \text{(Full amount + taxes)} \end{aligned}$$

$$\begin{aligned} \$55.00 \times 113\% &= \text{Total bill} \\ &\quad \swarrow \quad \searrow \\ &\quad \text{(Total percentage of the original amount)} \end{aligned}$$

Calculate:  $\$55.00 \times 1.13 = \text{Total bill}$

$\$62.15 = \text{Total bill}$

## SOMETHING TO CONSIDER

If you calculate first one percentage of an amount and then, from the last result, you calculate the second percentage, it is not the same as calculating both percentages from the original amount.

For example:  $(45 \times 0.06) \times 0.07 \neq 45 \times (0.06 + 0.07)$

# LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

5.1 Calculate the GST and PST on each of the following totals and complete the table below.

| Price before | GST $\times$ \$0.06 + | PST $\times$ \$0.07 = | Total price after taxes |
|--------------|-----------------------|-----------------------|-------------------------|
| \$25.00      |                       |                       |                         |
| \$125.00     |                       |                       |                         |
| \$52.00      |                       |                       |                         |
| \$32.50      |                       |                       |                         |
| \$135.75     |                       |                       |                         |
| \$50.40      |                       |                       |                         |
| \$325.45     |                       |                       |                         |
| \$45.15      |                       |                       |                         |
| \$63.74      |                       |                       |                         |
| \$53.49      |                       |                       |                         |

5.2 Complete the following table using the second method and compare totals.

| Price before taxes | GST and PST Price $\times$ \$1.13 = Total |
|--------------------|---|
| \$25.00            |   |
| \$125.00           |   |
| \$52.00            |   |
| \$32.50            |   |
| \$135.75           |   |
| \$50.40            |   |
| \$325.45           |   |
| \$45.15            |   |
| \$63.74            |   |
| <b>\$53.49</b>     |   |

## Skill 6: Calculate Discounts

TELL  
ME



You can calculate discounted prices in two ways.

### Method 1.

1. Calculate the amount of a discount.
2. Subtract it from the regular price.

### Method 2.

1. Calculate the discounted price by subtracting the percentage of the discount from the percentage of the regular price (100%).

SHOW  
ME



To find the sale price of an item regularly priced at \$45.00 that is on sale for 8% off, you do the following:

$$\$45.00 - (45 \times 0.08) = \text{Sale price}$$

### Method 1

1. Calculate the amount of the discount:

$$\$45 \times 8\% = \text{Discount}$$

$$\$45 \times 0.08 = \text{Discount}$$

$$\$3.60 = \text{Discount}$$

2. Subtract from the original amount:

$$\$45 - \$3.60 = \text{Sale price}$$

$$\$41.40 = \text{Sale price}$$

### Method 2

1. Calculate the discounted price by subtracting the percentage of the discount from the percentage of the regular price (100%).

$$\$45.00 \times (100\% - 8\%) = \text{Sale price}$$

$$\$45 \times 92\% = \text{Sale price}$$

$$\$45 \times 0.92 = \text{Sale price}$$

$$\$41.40 = \text{Sale price}$$

**LET ME TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

6.1 An item that is regularly priced at \$95.00 is on sale for 12% off. What is the sale price?

6.2 Use Method 1 to calculate the discounts and new totals for each of the following prices.

| Price      | Discount<br>(Paid in 30 days) | Discount<br>(Sales) | Total |
|------------|-------------------------------|---------------------|-------|
| \$300.00   | 5%                            | 15%                 |       |
| \$1,245.00 | 3%                            | 25%                 |       |
| \$989.55   | 5%                            | 10%                 |       |
| \$125.50   | 2%                            | 12.5%               |       |
| \$2,588.88 | 5%                            | 20%                 |       |
| \$3,565.70 | 2.5%                          | 8%                  |       |
| \$228.99   | 6%                            | 10%                 |       |
| \$5,600.00 | 7.5%                          | 8.5%                |       |
| \$65.50    | 2.5%                          | 12.5%               |       |

6.3 Use Method 2 to calculate the final price of each of these totals.

| Original Price | × % Totals to be paid | = Discounted price |
|----------------|-----------------------|--------------------|
| \$300.00       | × 95% × 85%           |                    |
| \$1,245.00     | × 97% × 75%           |                    |
| \$989.55       |                       |                    |
| \$125.50       |                       |                    |
| \$2,588.88     |                       |                    |
| \$3,565.70     |                       |                    |
| \$228.99       |                       |                    |
| \$5,600.00     |                       |                    |
| \$65.50        |                       |                    |

## Skill 7: Calculate Multiple Discounts

TELL  
ME



Use this skill to find the price for items or services that are discounted more than once. For example, an item may be discounted for a sale, and also discounted for paying within 30 days. A sale item may also be discounted again if bought in quantity.

1. Multiply the regular price by all of the discounted totals in one step.

SHOW  
ME



To calculate the total final cost of a purchase of \$950.00 with a discount of 10% for the sale season as well as an additional discount of 5% (pay within 30 days):

|              |         |
|--------------|---------|
| Discount 10% | pay 90% |
| Discount 5%  | pay 95% |

To calculate the total final cost of the purchase:

$$\begin{aligned} \$950.00 \times 0.90 \times 0.95 &= \text{Total final cost} \\ \$812.25 &= \text{Total final cost} \end{aligned}$$

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 7.1 A guest in the lounge has ordered drinks for a total cost of \$35.75. She uses a coupon for 10% off her bill and she also has a discount of 20% off for happy hour. How much does she have to pay?
- 7.2 A customer is buying a souvenir in the casino that was originally priced at \$49.98. It is on sale for 30% off. He also has a coupon for another 15% off. What does he have to pay?

## Skill 8: Determine Percentage

TELL  
ME



To find out what percentage one number is of the second number:

1. Divide the first number by the second.
2. Multiply the answer by 100 (move decimal point two places to the right).
3. Round to the desired precision.
4. Follow the answer with the % sign.

SHOW  
ME



The casino dining room has been operating at peak capacity for 68 of the last 87 days. Find out what percentage of days the dining room has operated at peak capacity by calculating what percentage 68 is of 87:

1. Divide  $68 \div 87 = 0.7816$
2. Multiply the answer by 100  $0.7816 \times 100 = 78.16$
3. Round 78.16 rounded to the nearest whole number = 78
4. Add % sign 68 is **78%** of 87

For 78% of the last 87 days, the dining room has operated at peak capacity.

LET ME  
TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

- 8.1 If there are 260 persons in the casino, and 140 are female, what percentage of the guests is female?
- 8.2 Your total budget for heating the casino for four months is \$9,000. You have been billed \$7,500 for heat by the end of two months. What percentage is your bill of your total budget?

# Challenge My Skills

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**C**hallenge your percentage skills using these multi-skill practice activities. See Check My Answers at the end of the section for the correct answers.

1. You are a server in the dining room. One customer presents a voucher for 1 meal at regular price, and the second (less expensive) meal at half price. The prices of the 2 meals are \$15.95 and \$18.75. The total cost of the drinks is \$20.50. These prices do not include PST or GST. Calculate the total cost of this customer's bill. How much change should he receive from \$100.00 cash?
2. A group of 8 customers orders dinner and drinks. The total bill is \$435.00, not including PST or GST. Each of the 4 couples would like to pay an average of the total cost of the bill. What is the average cost that each couple will have to pay?
3. The Hurricane Jackpot accumulated total is \$4,200.00. There were no winners within 52 BINGO numbers. For this game only, the payout will be 50% of the pot for a BINGO called within 53 numbers. Within 54 numbers, the payout will be 35%, and within 55 numbers, the payout will be 20%. If no-one wins within 55 numbers, the pot is reduced to \$300.00 and a new game will begin.  
Calculate the payout to a player who wins on the 53rd number called.
4. A business is allowed to claim equipment expenses to reduce its taxable income. Normally, the cost of a computer is broken down and expensed over 5 years. How much can a company write off as an equipment expense in the first year after purchase if it buys fifteen new computers at \$2,490.00 each, plus 6% GST and 7% PST?
5. The total cost for heating a particular building is \$2,200.00 per month. The cost of fuel is expected to go up by 9% over the next 6 months. Estimate the cost of heat per month for this building after the increase. Then calculate the actual monthly cost.
6. In the BINGO hall, there are one hundred automated play stations and seventy-eight tables that seat 4 players each. If the hall is about 50% full, about how many people are playing?



**C**ompare your answers for Let Me Try and Challenge My Skills activities below. If you have less than half the answers correct, review the material and try the activities again.

### **Skill 1: Convert a Percentage to a Fraction and Fraction to a Percentage**

1.1  $\frac{7}{25}$

1.2 66.7% (rounded up = 67%)

### **Skill 2: Convert a Percentage to a Decimal and Decimal to a Percentage**

2.1 0.15

2.2 73%

### **Skill 3: Find the Percentage of a Number using a Proportion**

3.1 \$4.08

3.2 \$2.13

### **Skill 4: Find the Percentage of a Number in One Step**

4.1 \$37.95

4.2 \$239.03

## Skill 5: Calculate More than One Percentage

### 5.1

| Price before taxes + | GST $\times$ \$0.06 + | PST $\times$ \$0.07 = | Total price after taxes |
|----------------------|-----------------------|-----------------------|-------------------------|
| \$25.00              | \$1.50                | \$1.75                | \$28.25                 |
| \$125.00             | \$7.50                | \$8.75                | \$141.25                |
| \$52.00              | \$3.12                | \$3.64                | \$58.76                 |
| \$32.50              | \$1.95                | \$2.28                | \$36.73                 |
| \$135.75             | \$8.15                | \$9.50                | \$153.40                |
| \$50.40              | \$3.02                | \$3.53                | \$56.95                 |
| \$325.45             | \$19.53               | \$22.78               | \$367.76                |
| \$45.15              | \$2.71                | \$3.16                | \$51.02                 |
| \$63.74              | \$3.82                | \$4.46                | \$72.02                 |
| \$53.49              | \$3.21                | \$3.74                | \$60.44                 |

### 5.2

| Price before taxes | GST and PST Price $\times$ \$1.13 = Total |
|--------------------|---|
| \$25.00            | \$28.25                                   |
| \$125.00           | \$141.25                                  |
| \$52.00            | \$58.76                                   |
| \$32.50            | \$36.73                                   |
| \$135.75           | \$153.40                                  |
| \$50.40            | \$56.95                                   |
| \$325.45           | \$367.76                                  |
| \$45.15            | \$51.02                                   |
| \$63.74            | \$72.03                                   |
| \$53.49            | \$60.44                                   |

## Skill 6: Calculate Discounts

6.1 \$83.60

## 6.2

| Price      | Discount<br>(Paid in 30 days) | Discount<br>(Sales) | Total      |
|------------|-------------------------------|---------------------|------------|
| \$300.00   | 5%<br>\$15.00 \$285.00        | 15%<br>\$42.75      | \$242.25   |
| \$1,245.00 | 3%<br>\$37.35 \$1,207.65      | 25%<br>\$301.91     | \$905.74   |
| \$989.55   | 5%<br>\$49.48 \$940.07        | 10%<br>\$94.01      | \$846.06   |
| \$125.50   | 2%<br>\$2.51 \$122.99         | 12.5%<br>\$15.37    | \$107.62   |
| \$2,588.88 | 5%<br>\$129.44 \$2,459.44     | 20%<br>\$491.89     | \$1,967.55 |
| \$3,565.70 | 2.5%<br>\$89.14 \$3,476.56    | 8%<br>\$278.12      | \$3,198.44 |
| \$228.99   | 6%<br>\$13.74 \$215.25        | 10%<br>\$21.53      | \$193.72   |
| \$5,600.00 | 7.5%<br>\$420 \$5,180.00      | 8.5%<br>\$440.30    | \$4,739.70 |
| \$65.50    | 2.5%<br>\$1.64 \$63.86        | 12.5%<br>\$7.98     | \$55.88    |

## 6.3

| Original Price | × % Totals to be paid | = Discounted price |
|----------------|-----------------------|--------------------|
| \$300.00       | × 95% × 85%           | = \$242.25         |
| \$1,245.00     | × 97% × 75%           | = \$905.74         |
| \$989.55       | × 95% × 90%           | = \$846.07         |
| \$125.50       | × 98% × 87.5%         | = \$107.62         |
| \$2,588.88     | × 95% × 80%           | = \$1,967.55       |
| \$3,565.70     | × 97.5% × 92%         | = \$3,198.43       |
| \$228.99       | × 94% × 90%           | = \$193.73         |
| \$5,600.00     | × 92.5% × 91.5%       | = \$4,739.70       |
| \$65.50        | × 97.5% × 87.5%       | = \$55.88          |

## Skill 7: Calculate Multiple Discounts

7.1 \$25.74

7.2 \$29.74

## Skill 8: Determine Percentage

8.1 140 out of 260 is:  $\frac{140}{260}$  or = 0.538461538462 or about 54% of the guests are female.

8.2 83.33%

## Challenge My Skills

1. \$46.15
2. \$122.89
3. \$2,100.00
4. \$8,441.10
5. The estimated cost per month would be about \$2,420. The actual cost per month would be \$2,398.00.
6. About 206 people

# Foundation Section

## Probability





# Teaching Tips

To introduce the concept of probability you can play different games with the learners.

For example:

- Let learners roll a die and write on a flipchart the outcome. Once you have rolled the die several times with each learner, let him or her count how many times the die landed with each number. Divide each quantity by the total number of events and let them see that each number is close to  $1/6$ .
- Have a contest for a piece of candy or a pop. Place 12 poker chips in a box, five yellow (worth \$1000) and seven black (worth \$100). Have each student close his or her eyes and reach into the box, and grab one chip. Write the outcomes on a flipchart. Keep track of each learner's chips. The learner that pulls the yellow chip wins. Divide the number of times the students picked the yellow chip by the number of times the students pulled out a chip. The result will be close to  $5/12$ . This means the chances of picking a yellow chip are 5 out of 12. You can set this up as a fraction or a percentage that expresses the probability of picking a yellow chip:  $5/12$  or 42%. Reward the learner with the highest value of chips with a candy or a pop.

# Introduction

The study of probability helps us figure out the likelihood of something happening. For instance, when you roll a pair of dice, you might ask how likely you are to roll a seven. In math, we call the “something happening” an “event”.

Understanding probability is very important in the gaming industry. For example, casino table games workers need to know how to calculate the probability or the “odds” of card deals, dice rolls or other outcomes in their games. Security workers must understand probability to make sure that guests are playing fairly.

In this chapter you will learn how to:

- Find the Probability of a Single Event
- Find the Complementary Odds



Some jobs that need  
Probability skills

Department Manager  
Facility Technician  
Investigative Security Officer  
Table Games Inspector  
Uniforms Supervisor  
Uniforms Technician



# Probability

**B**efore studying how to calculate probability, here are some definitions you should know:

**Experiment** is a situation involving chance or probability that leads to results called outcomes. For example, rolling a die is an experiment.

**Outcome** is the result of a single trial of an experiment. For example, the possible outcomes are landing on 1, 2, 3, 4, 5, and 6.

**Successful Outcome** is the outcome you want. For example, if you want to roll a 6 and you do roll a 6, that is a successful outcome

**Event** is one or more outcomes of an experiment. One event of this experiment above is landing on 4.

**Probability** is the measure of how likely an event is.

Here is a formula to find the probability of an event.

$$\text{Probability} = \frac{\text{\# of successful outcomes}}{\text{\# of all possible outcomes}}$$

Events that are unlikely to happen will have a probability near 0.

Events that are likely to happen will have a probability near 1

## SOMETHING TO CONSIDER

In any probability problem, it is very important to identify all the different outcomes that could occur. For instance, when you roll a pair of dice, you might want to know how likely you are to roll a seven. You must figure out all the different ways the dice could land, and all the different ways you could roll a seven.

# Skill 1: Find the Probability of a Single Event

TELL  
ME



Single event probability refers to the probability of having a successful outcome with only one try.

To find the probability of a single event occurring:

1. Find out the number of possible successful outcomes.
2. Find out the number of all possibilities.
3. Divide the result of step 1 by the number you got in step 2. You may also express this as a fraction where the top is the number you got in 1 and the bottom is the number you got in 2.

SHOW  
ME



To find the probability of rolling a 5 with a single die, you would do the following:

Probability =  $\frac{\text{\# of successful outcomes (roll a 5)}}{\text{\# of all possible outcomes (roll a 1, 2, 3, 4, 5, or 6)}}$

$$P = \frac{1 \text{ chance}}{6 \text{ possibilities}} = \frac{1}{6}$$

To find the probability of rolling an odd number with a single die, you would do the following:

$$P = \frac{3 \text{ chances (1,2,3)}}{6 \text{ possibilities}} = \frac{3}{6} = \frac{1}{2}$$

## SOMETHING TO CONSIDER

Always reduce probability statements, as you would a fraction, to the lowest terms. For example,  
reduce to  $\frac{2}{6} = \frac{1}{3}$



This is how to find the chance (probability) that you will draw a 7 from a deck without Jokers:

$$P = \frac{4 \text{ (there are 4 sevens in the deck)}}{52 \text{ (there are 52 cards in the deck)}}$$

$$P = \frac{4}{52} = \frac{1}{13}$$

This is how to find the chance (probability) that you will draw a face card from a deck without Jokers:

$$P = \frac{12 \text{ (4 suits} \times \text{3 face cards per suit)}}{52 \text{ (Total cards in the deck)}} = \frac{12}{52} = \frac{3}{13}$$

**LET ME  
TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

Remember to reduce your answers to lowest terms.

- 1.1 When you draw at random from a standard deck of 52 cards, what is the probability that you will draw a red card?
- 1.2 When you draw from a standard deck of cards plus two Jokers, what is the probability that you will draw a face card?

1.3 When you draw at random from a deck of 52 cards, what is the probability that you will draw a spade?

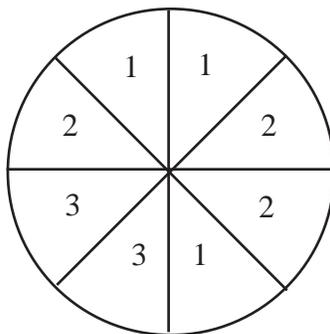
1.4 When you toss two dice (of different colours) there will be a total of thirty-six combinations that you can toss. The chart below illustrates all possible combinations.

| White /Red | 1   | 2   | 3   | 4   | 5   | 6   |
|------------|-----|-----|-----|-----|-----|-----|
| 1          | 1,1 | 1,2 | 1,3 | 1,4 | 1,5 | 1,6 |
| 2          | 2,1 | 2,2 | 2,3 | 2,4 | 2,5 | 2,6 |
| 3          | 3,1 | 3,2 | 3,3 | 3,4 | 3,5 | 3,6 |
| 4          | 4,1 | 4,2 | 4,3 | 4,4 | 4,5 | 4,6 |
| 5          | 5,1 | 5,2 | 5,3 | 5,4 | 5,5 | 5,6 |
| 6          | 6,1 | 6,2 | 6,3 | 6,4 | 6,5 | 6,6 |

Answer the following questions using the chart above. Remember to reduce your answers to lowest terms.

- What are the odds of tossing a Red 3 and a White 6?
- What are the odds of tossing a White 3 and a Red 6?
- What are the odds of tossing “Snake Eyes”?
- What are the odds of tossing a double? (Look at the diagonal.)
- What are the odds of tossing a 7? (Total of both dice.)
- What are the odds of tossing an 11?

1.5 Use the diagram of the spinner below to answer questions a - c.



- What is the probability that you will spin a 1?
- What is the probability that you will spin a number greater than 2?
- What are the odds that you will spin a number less than 5?

1.6 When you toss 2 dice, what is the probability that the total will be greater than 7?

## Skill 2: Find the Complementary Odds

TELL  
ME



Complementary odds refer to the probability that something will *not* happen. To find the complementary odds:

1. Use \*Certain Odds (=1) as a basis for calculating complementary odds.
2. Subtract the successful outcome from the total number of possible outcomes.
3. Place the result over the total number of possible outcomes.

\* Certain odds are the odds certain to occur which have a probability equal to 1. For example, the probability that a teacher chooses a girl from a class of 30 girls is 1. Since all the students in the class are girls, the teacher is certain to choose a girl.

$$P = \frac{30}{30} = 1$$

SHOW  
ME



To find the odds of drawing the Jack of Spades from a full deck without the Jokers, you would do the following:

$$P = \frac{1}{52}$$

To find the complementary odds, or the odds that you won't draw the Ace of Spades, you would do the following:

$$P = \frac{52 - 1}{52} = \frac{51}{52}$$

To find the odds you will roll Snake Eyes by rolling two dice (1 white and 1 red), you would do the following:

$$P = \frac{1}{36}$$

To find the complementary odds, or the odds that you won't roll Snake Eyes, you would do the following:

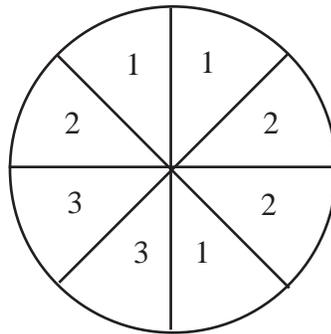
$$P = \frac{36 - 1}{36} = \frac{35}{36}$$



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

Remember to reduce your answers to lowest terms.

2.1 Use the diagram of the spinner below to answer questions a - c.



- a) What are the odds that you will not spin a 1?
  - b) What are the odds that you will not spin an odd number?
  - c) What are the odds that you will not spin a 4?
- 2.2 When you roll two dice (both the same colour), what is the probability that you will roll a pair of 5's?
- 2.3 When you roll two dice (both the same colour), what is the probability that you will roll a total of 10?
- 2.4 The probability that someone will score three strikes in a row in his next bowling game is 0.33. What is the probability that he will not score three strikes in a row?
- 2.5 You are drawing from a standard deck of cards. Answer the following:
- a) What is the probability that the first card you draw will be an ace?
  - b) You replace the first card. What is the probability the second card you draw will be the ace of hearts?
  - c) You draw a 10 of diamonds on your second draw. You keep it. What is the probability that the third card you draw will be another 10?
  - d) You draw a 2 of spades on your third draw. You keep it. What is the probability that the fourth card you draw will be a 6? (remember you have 2 cards)



**C**ompare your answers for Let Me Try activities below. If you have less than half the answers correct, review the material and try the activities again.

### Skill 1: Find the Probability of a Single Event

1.1  $26/52$  or  $\frac{1}{2}$  (50%)

1.2  $12/54$  or  $2/9$

1.3  $13/52$  or  $\frac{1}{4}$

1.4

a)  $1/36$

b)  $1/36$

c)  $1/36$

d)  $6/36$  or  $1/6$

e)  $6/36$  or  $1/6$

f)  $2/36$  or  $1/18$

1.5

a)  $3/8$

b)  $2/8$

c)  $8/8$  or 1

1.6  $15/36$  or  $5/12$

### Skill 2: Find the Complementary Odds

2.1

a)  $5/8$

b)  $3/8$

c)  $8/8$  or 1

2.2  $1/36$

2.3  $3/36$  or  $1/12$

2.4 0.67

2.5

a)  $1/13$

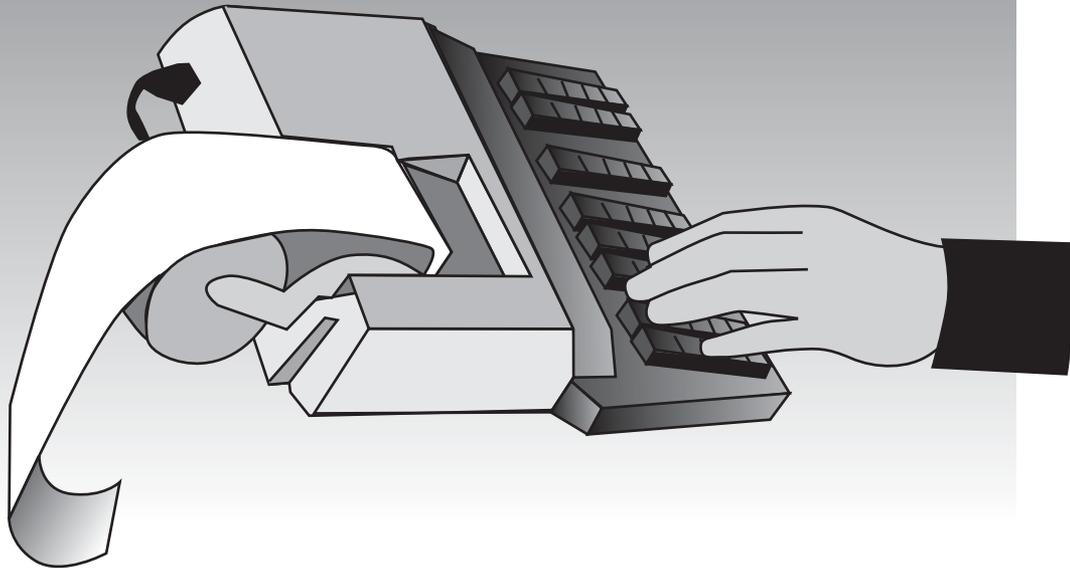
b)  $1/52$

c)  $3/51$  or  $1/17$

d)  $4/50$  or  $2/25$

# Foundation Section

## Rates



# Introduction

**G**aming industry workers need to know how to use rates to perform many tasks. For example, you would use rates to:

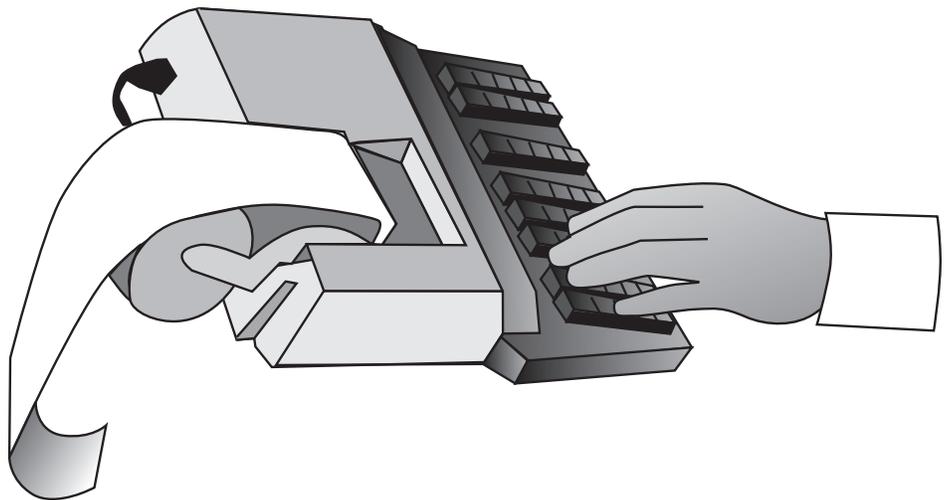
- Determine the size of work crew required and schedule the length of a specific job using established production rate per person
- Prepare simple financial summaries
- Compare cost-effective options for a long-distance phone service
- Calculate the energy used by an air conditioning system
- Calculate how much gas a fleet of cars will use

In this section, you will learn how to

- Solve a Rate Problem by Using a Formula
- Find Cost per Unit
- Compare Rates
- Calculate Power (or Wattage)

Some jobs that need  
Rates skills

Bank Supervisor  
Banquet Supervisor  
Bartender  
Bingo Volunteer Coordinator  
BVK Supervisor  
Casino Bank Cashier  
Chef  
Cook  
Department Manager  
Facilities Supervisor  
Facility Technician  
Guest Services Supervisor  
Hostess  
Housekeeping Attendant  
Housekeeping Supervisor  
Maintenance Technician  
Retail Supervisor  
Security Officer Security Supervisor  
Senior Cashier  
Senior Clerk Typist  
Server  
Shuttle Bus Driver  
Slot Attendant  
Slot Floor Supervisor  
Surveillance Technician  
Switchboard Operator  
Tables Game Inspector  
Valet Attendant  
Warehouse Supervisor



# Rate:

A rate is a ratio that compares two different kinds of numbers, such as miles per hour, dollars per pound, or kilowatts per hour, etc.

The word “per” is always a clue that you are dealing with a rate.

Unit price is a particular rate that compares a price to some unit of measure. For example, suppose eggs are on sale for \$0.72 per dozen. The unit price is \$0.72 divided by 12, or 6 cents per egg. A unit rate compares a quantity to its unit of measure. A unit price is a rate comparing the price of an item to its unit of measure.

Problems using this type of rate can be solved using a proportion, or a formula.

## Skill 1: Solve a Rate Problem by Using a Formula

TELL  
ME



The following formula is used to calculate total cost:

$$\text{Total cost} = \text{Cost per unit} \times \# \text{ of units}$$

SHOW  
ME



You are responsible for buying carpet as part of renovating the main dining room. The cost of carpet and installation is \$50.00 per square metre, all taxes and delivery costs included.

To find the cost for this carpet if the area of the dining room is 550 square metres, do the following:

$$\text{Total cost} = \$50.00 \text{ per square metre} \times 550 \text{ sq. m}$$

$$\text{Total cost} = \$27,500.00$$

You are buying fruit for Sunday's brunch. You need the following ingredients:

|            |       |                     |
|------------|-------|---------------------|
| Apples     | 12 lb | \$0.55 cents per lb |
| Oranges    | 12 lb | \$0.59 cents per lb |
| Pineapple  | 10 lb | \$0.90 cents per lb |
| Grapefruit | 7½ lb | \$0.50 cents per lb |
| Kiwi       | 7½ lb | \$1.20 per lb       |
| Cantaloupe | 6 lb  | \$0.75 cents per lb |
| Red Grapes | 5 lb  | \$4.50 per lb       |

To calculate the total cost of the fruit salad, use the rates (cost per unit prices):

|            |                    |           |
|------------|--------------------|-----------|
| Apples     | 12 lb × \$0.55/lb  | = \$6.60  |
| Oranges    | 12 lb × \$0.59/lb  | = \$7.08  |
| Pineapple  | 10 lb × \$0.90/lb  | = \$9.00  |
| Grapefruit | 7.5 lb × \$0.50/lb | = \$3.75  |
| Kiwi       | 7.5 lb × \$1.20/lb | = \$9.00  |
| Cantaloupe | 6 lb × \$0.75/lb   | = \$4.50  |
| Red Grapes | 5 lb × \$4.50/lb   | = \$22.50 |
| Total Cost |                    | = \$62.43 |

**LET ME TRY**



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers

- 1.1 Mrs. Adams expects to serve 120 guests on Sunday morning. The average serving of fruit salad per guest is 0.3 lb. She has 60 lb of fruit. Will she have enough fruit salad? Assume a loss of 15% mass by weight for peels and seeds.

## Skill 2: Find Cost per Unit

TELL  
ME



To find cost per unit:

1. Divide both sides of the = by # of units.

$$\frac{\text{Total cost}}{\# \text{ of units}} = \frac{\text{Cost per unit} \times \cancel{\# \text{ of units}}}{\cancel{\# \text{ of units}}} >$$

Cancel common factors in numerator & denominator

2. Cancel common factors in the numerator and denominator.

$$\frac{\text{Total Cost}}{\# \text{ of units}} = \text{Cost per unit}$$

SHOW  
ME



You have been quoted a total price of \$8,000.00 for 16 new desks. This price includes taxes, delivery, and assembly. Also included is a one-year warranty. To find the unit cost, or cost per desk:

Step 1. Insert the values into the rate formula.

$$\$8,000.00 = \text{Cost per unit} \times 16 \text{ units}$$

Step 2. Divide both sides of the equation by the known variable (in this case, # of units).

$$\frac{\$8,000.00}{16 \text{ units}} = \frac{\text{Cost per unit} \times \cancel{16 \text{ units}}}{\cancel{16 \text{ units}}} >$$

Cancel common factors in numerator & denominator

$$\frac{\$8,000.00}{16 \text{ units}} = \text{Cost per unit}$$

$$\$500.00 = \text{Cost per desk}$$

## LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers

- 2.1 You want to buy 85 beds for a new casino hotel. Your supplier quotes you a price of \$32,555, including taxes, delivery, assembly and warranty. What is the unit price of each bed?
- 2.2 Your supplier has offered you a deal on 100 sets of dishes with 12 settings each. The total cost will be \$1,800.00. What is the unit price per setting?

## Skill 3: Compare Rates

### TELL ME



To compare rates, do the following:

1. Find cost per unit.
2. Compare costs based on unit pricing.

### SHOW ME



You need to decide which type of cleaning solvent to buy for the Triple Z Casino. You have found the following prices:

|           |                        |
|-----------|------------------------|
| Solvent A | \$29.95 for 120 ounces |
| Solvent B | \$36.99 for 160 ounces |
| Solvent C | \$40.00 for 200 ounces |

You assume that all of the cleaning solvents are equally good. Based on

the information given above, you can find the most cost-effective purchase when you:

1. Find the cost per unit:

$$\begin{array}{l} \text{Solvent A} \quad \frac{\$29.95}{120} = \text{Cost per ounce} \\ \quad \quad \quad 0.25 = \text{Cost per ounce} \end{array}$$

$$\begin{array}{l} \text{Solvent B} \quad \frac{\$36.99}{160} = \text{Cost per ounce} \\ \quad \quad \quad 0.23 = \text{Cost per ounce} \end{array}$$

$$\begin{array}{l} \text{Solvent C} \quad \frac{\$40.00}{200} = \text{Cost per ounce} \\ \quad \quad \quad 0.20 = \text{Cost per ounce} \end{array}$$

2. Compare costs based on unit pricing:

Based on unit pricing, **Solvent C** is the best buy.

## SOMETHING TO CONSIDER

When comparing rates, always check to see which units of measurement are being used. For instance, three dollars per ounce is very different from three cents per ounce.

## SOMETHING TO CONSIDER

A useful tip in solving any math or science problem is to always write out the units when multiplying, dividing or converting from one unit to another. For example, to find the total cost of 5 kg of flour at \$2 per kilo, write it out like this:  $\$2/\text{kg} \times 5 \text{ kg} = \$10$ . With the units written into the equation, you answer with the correct kind of units.

## LET ME TRY



Now it's your turn. Try these practice activities to see how well you have learned this skill. See Check My Answers at the end of the section for the correct answers.

3.1 You have to buy 100 kg of standing rib roast for the Triple Z Casino. You have found the following prices:

Supplier A \$17.50 for 1 kg

Supplier B \$36.99 for 2 kg

Supplier C \$50.00 for 4 kg

Which supplier is offering the lowest price per kg?

## Skill 4: Calculate Power (or Wattage)

### TELL ME



**Power** is measured in **watts**, **energy** used is measured in **joules** and **time** is measured in **seconds**.

$$\text{Power (watts)} = \frac{\text{energy used (joules)}}{\text{time (seconds)}}$$

**To calculate power (wattage), use this equation:**

$$\text{energy used} = \text{power} \times \text{time}$$

### SHOW ME



A sound system has a power rating of 1800 W. To calculate how much energy it will use in eight hours, do the following:

$$\text{Eight hours} = 8 \times 60 \times 60 = 28,800 \text{ seconds}$$

$$\begin{aligned} \text{energy used} &= \text{power (watts)} \times \text{time (seconds)} \\ \text{energy used} &= 1800 \text{ watt} \times 28,800 \text{ seconds} \\ \text{energy used} &= 51,840,000 \text{ joules} \end{aligned}$$

An air-conditioning unit has a power rating of 3000 W. To calculate how much energy it will use in twenty-four hours, do the following:

$$24 = 24 \times 60 \times 60 = 86,400 \text{ seconds}$$

$$\begin{aligned} \text{energy used} &= \text{power} \times \text{time} \\ \text{energy used} &= 3000 \text{ watts} \times 86,400 \text{ seconds} \\ \text{energy used} &= 259,200,000 \text{ joules} \end{aligned}$$

This air-conditioning unit is 90% efficient. To calculate how much energy is wasted, do the following:

$$\begin{aligned} \text{Energy wasted} &= 259,200,000 \times 0.10 \\ \text{Energy wasted} &= 25,920,000 \text{ Joules} \end{aligned}$$

We pay for energy in kilowatt hours (or kilowatts  $\times$  hours). If:

$$\begin{aligned} 1 \text{ watt} &= 1 \text{ joule per second} \\ 1 \text{ kilowatt} &= 1000 \text{ watts} = 1000 \text{ joules per second} \\ 1 \text{ hour} &= 60 \times 60 \text{ seconds} \end{aligned}$$

We can find the number of kilowatt hours (kWh) by using the following calculation:

$$\frac{25,920,000 \text{ joules}}{1000 \times 60 \times 60} = 7.2 \text{ kWh}$$

At \$0.07 cents per kilowatt hour, the costs of wasted energy will add up, especially in a large facility (such as a casino) that consumes a great deal of energy.

**LET ME  
TRY**



4.1 A lighting system has a power rating of 2100 W. How much energy will it use in 24 hours?

# Challenge My Skills

**C**hallenge your rates skills using these multi-skill practice activities. See Check My Answers at the end of the section for the correct answers.

The prices given in problems 1 – 4 are tax included.

1. Regular unleaded gas costs \$0.90 per litre. What is the cost to fill up a fleet of maintenance vehicles if the tank of each vehicle holds 55 litres, and there are 7 vehicles in the fleet?
2. The average gas mileage of the fleet vehicles when they use regular unleaded gas is 8.25 km per litre. How many kilometres can one vehicle drive using regular unleaded gas? What is the fuel cost per kilometre?
3. Premium unleaded gas costs \$0.98 per litre. The average gas mileage of the fleet vehicles when they use premium unleaded gas is increased by 10%. How many kilometres can they drive using premium unleaded gas? What is the fuel cost per kilometre?
4. At \$0.98 per litre for premium unleaded gas, compare the value of purchasing regular unleaded gas with the value of purchasing premium unleaded.
5. The average cost of heating the large dining room is \$400.00 per month. With new insulation, this can be reduced by 20%. The cost of insulating the dining room has been estimated at \$2,500.00.
  - a) How much will be saved during the first year after the insulation is installed?
  - b) Estimate how many years it will take for the insulation to pay for itself in savings on heating costs.

**Use the following information to solve problems 6 – 9 below.**

When mixing drinks, the usual ratio of spirits to mix is 1:5 (or 1 part spirits to 5 parts mix).

6. How many ounces of mix will be needed to make 15 drinks? At a unit cost of \$0.0135 per ounce, how much will the mix cost?

7. At a unit cost of \$0.95 cents per ounce of spirits, how much will it cost to make those 15 drinks?
8. What is the total cost of spirits and mix to make these drinks?
9. If the drinks are sold for \$2.75 each, what profit will be made on those 15 drinks?
10. Cheri is a supervisor in the housekeeping department. She has been reviewing her employees' attendance patterns. In the chart below, she has listed each employee's scheduled shifts and shifts missed due to sickness. Calculate the percentage of sick time used by each employee as a portion of time worked.

| Employee Name | Total Shifts Assigned @ 8 hours per shift | Total Shifts Off Sick     |
|---------------|---|---------------------------|
| Hillary       | 6 shifts                                  | One-half (4 hours)        |
| Rosario       | 6 shifts                                  | 1 and one-half (12 hours) |
| Margie        | 6 shifts                                  | 1 hour                    |
| Val           | 6 shifts                                  | 2 hours                   |

11. To mix fuel for a chain saw, the ratio of gas to oil is 50:1 (or 50 parts gas to 1 part oil). If you need to mix 1 litre of gas with oil, how much oil should you use?



**C**ompare your answers for Let Me Try and Challenge My Skills activities below. If you have less than half the answers correct, review the material and try the activities again.

### Skill 1: Solve a Rate Problem by Using a Formula

1.1  $120 \times 0.3 \text{ lb} = 36 \text{ lb}$  (needed to feed 120 guests),  $60 \text{ lb} - 15\% = 51 \text{ lb}$  (available to feed guests). Yes, she will have enough fruit salad.

### Skill 2: Find Cost per Unit

2.1 Each bed costs \$383.00.

2.2 Each setting costs \$1.50.

### Skill 3: Compare Rates

3.1

Supplier A = \$17.50/kg

Supplier B = \$18.50/kg

Supplier C = \$12.50/kg

Supplier C offers the lowest price.

### Skill 4: Calculate Power (or Wattage)

4.1

$24 \text{ hours} = 24 \times 60 \times 60 = 86,400 \text{ seconds}$

Energy used = power (watts)  $\times$  time (seconds)

Energy used = 2100 watts  $\times$  86,400 seconds

Energy used = 181,440,000 joules

# Challenge My Skills

1. \$346.50
2. 453.75 km cost is \$0.1091/km
3. 499.125 – cost is \$0.107989/km
4. Save about 0.1 cents per km
5.
  - a) \$960.00
  - b)  $2500 \div 960 = 2.6$  years
6. 75 oz. will be needed for 15 drinks. The mix will cost \$1.01.
7. \$14.25
8. \$15.26
9. \$25.99
10. Hillary: 8.33%  
Rosario: 25%  
Margie: 0.02%  
Val: 0.04%
11. 0.02L

# Essential Skills for the Gaming Industry

## Casino Math



# Job Family Section

## Bank



# Introduction

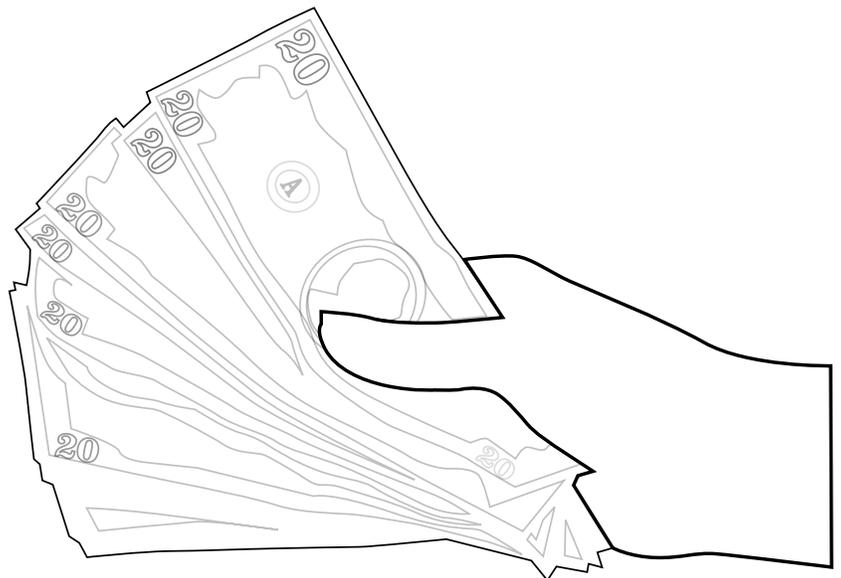
**T**his section deals with the math skills used by bank workers in the gaming industry. Bank employees work with cash and “cash-like” items such as chips, tokens and TITO (“Ticket In Ticket Out”) receipts. They must be able to count and record transactions quickly and accurately, and to count large sums of money. They must also convert currency from US to Canadian and vice versa. In addition, they must also have the skills to estimate amounts of money.

In this section, you will practice how to:

- Count Cash
- Calculate the Cash Value of Chips
- Check Calculations Done by Someone Else
- Convert Currency
- Estimate Amounts of Money

Now it’s your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for this task.



## Task 1:

# Count Cash

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

1.1 What is the value of:

- A sealed bag of loonies
- A sealed bag of toonies
- A sealed bag of nickels
- A sealed bag of dimes
- A sealed bag of quarters
- 1 bundle of \$5 bills
- 2 bundles of \$20 bills
- 3 bundles of \$10 bills

1.2 How many coins are there in a sealed bag?

1.3 Find the value of each of the following:

- A sealed bag of toonies
- 3 rolls of quarters
- A bundle of \$20 bills
- A bundle of \$50 bills
- A sealed bag of nickels
- 5 green chips
- 10 orange chips
- 12 red chips
- 20 white chips
- 16 black chips

1.4 How many bills are there in a bundle?

1.5 At your booth, you have these amounts. Calculate the value of each type of currency and add it up for the total cash value.

- 8 toonies
- 13 loonies
- 1 bag nickels
- 2 bags quarters
- 2 bundles of \$5 bills
- 23 tokens (each worth \$5)
- TITO receipts: \$12.50, \$15.25, \$22.75
- What is the total cash value of the currency in your booth?

- 1.6 A guest would like you to give her change in \$5 bills for one \$50 bill and two \$20 bills. How many \$5 bills do you give her?
- 1.7 What is the value of each of the following?
- a) 2 bundles of \$10 bills and a bag of loonies
  - b) 1 bundle of \$20 bills, 35 \$5 bills, and 2 rolls of quarters
  - c) 17 \$50 bills and a sealed bag of nickels
  - d) 113 \$5 bills and 8 rolls of dimes
  - e) 3 bags of toonies and 4 rolls of loonies
- 1.8 Calculate the total of a, b and d in question 1.4.
- 1.9 You have a total of \$8,450.73 at your station. Your supervisor wants to decrease your cash so that you have \$500.00 on hand. How much should she take?
- 1.10 What is the value of:
- a) 65 nickels
  - b) 233 dimes
  - c) 45 quarters
  - d) 525 toonies
  - e) 75 \$5 bills
  - f) 334 \$10 bills
  - g) 265 \$20 bills
  - h) 87 \$50 bills

## ► Level 2

- 1.11 A guest comes to your booth with the following:

|                |  |
|----------------|--|
| TITO receipts: | \$10.00, \$15.25, \$23.00  |
| Tokens         | 4 tokens @ \$5 each  |
| Bills          | 1 \$50 bill US (The present rate of exchange is \$1.00 US = \$1.30 CDN.) |

How much cash do you give this guest in exchange for all of these items?

1.12 Use the following information to answer questions a – c below.

You began your shift with a \$600.00 float. Two hours later you have TITO receipts totaling \$343.00, plus 1 bag of loonies, 1 bag of toonies, 3 yellow chips, 125 orange chips and bills totaling \$1,150.

- a) What have your receipts been so far this shift?
- b) The bank supervisor “decreases you” by 1 bundle of \$5 bills. What is the total amount of the decrease?
- c) How much do you have left at your booth?

1.13 Calculate the total value of the following:

|               |                                    |
|---------------|------------------------------------|
| Tokens        | 7 tokens @ \$5 each                |
| TITO receipts | \$12.50, \$25.00, \$18.25, \$32.00 |
| Orange chips  | 40                                 |

1.14 At the beginning of your shift, you had a \$500 float. You now have:

TITO receipts: \$445  
1 roll + 39 toonies  
3 rolls + 36 loonies  
1 bundle + 9 \$5 bills  
1 bundle + 31 \$10 bills  
61 \$20 bills

- a) How much have you taken in since your shift began?
- b) Your supervisor takes your TITO receipts and your bundles of \$5 and \$10 bills. What is the total amount that she takes?
- c) How much cash, including your original float, do you now have on hand at your booth?

1.15 Use the following information to answer questions a – d.

You began your shift with a cash float of \$600.00. You have the following receipts:

|      |   |
|------|---|
| TITO | \$450.00<br>\$223.00<br>\$186.00<br>\$77.00   |
| Cash | 300 toonies<br>1 bag of loonies<br>4 rolls of quarters<br>8 rolls of nickels<br>43 dimes<br>3 bundles of \$5 bills<br>2 bundles of \$10 bills<br>2 bundles of \$20 bills<br>\$40.00 in \$5 bills<br>\$90.00 in \$10 bills<br>\$480.00 in \$20 bills<br>\$300.00 in \$50 bills |

You make up a deposit slip as follows:

|      |   |
|------|---|
| TITO | \$936.00  |
| Cash | Toonies \$550.00<br>Loonies \$950.00<br>Nickels \$6.00<br>\$5 bills \$1,450.00<br>\$10 bills \$2,000.00<br>\$20 bills \$4,300.00<br>\$50 bills \$300.00 |

- What is the total value of the deposit?
- How much cash should you have on hand after your supervisor takes your deposit?
- A summary of your transactions over the next two hours is as follows:

|               |                            |
|---------------|----------------------------|
| TITO          | \$45.00, \$135.00, \$26.00 |
| Cash receipts | \$2,346.00                 |
| Payouts       | \$1,450.00                 |

How much cash should you now have on hand? How much in TITO receipts?

- What is the value of all items you have on hand?

1.16 Use the following information to answer questions a – e.

You began your shift with a cash float of \$500.00. You now have the following items on hand (the value of 1.00 US is \$1.25 CDN):

TITO \$45.00, \$38.00, \$100.00, \$75.70

|      |             |            |
|------|-------------|------------|
| Cash | Toonies     | \$2,550.00 |
|      | Loonies     | \$890.00   |
|      | Quarters    | \$65.00    |
|      | Dimes       | \$55.00    |
|      | Nickels     | \$25.50    |
|      | Pennies     | \$1.26     |
|      | \$5 bills   | \$95.00    |
|      | \$10 bills  | \$180.00   |
|      | \$20 bills  | \$360.00   |
|      | \$50 bills  | \$550.00   |
|      | \$100 bills | \$800.00   |
|      | US currency | \$1,800.00 |

You make up the following deposit slip:

TITO \$258.70

|      |             |                                     |
|------|-------------|-------------------------------------|
| Cash | Toonies     | \$2,500.00                          |
|      | Loonies     | \$500.00                            |
|      | Quarters    | \$50.00                             |
|      | Dimes       | \$50.00                             |
|      | Nickels     | \$25.00                             |
|      | Pennies     | \$1.00                              |
|      | \$5 bills   | \$50.00                             |
|      | \$50 bills  | \$550.00                            |
|      | \$100 bills | \$800.00                            |
|      | US currency | \$1,800.00 (\$1.00 CDN = \$0.80 US) |

- What is the total cash you have on hand before you make the deposit?
- How much cash have you taken in since the beginning of your shift?
- What is total amount of your deposit? (\$1.00 CDN = \$0.80 US)
- How much cash (including your float) should you have on hand after you make your deposit?
- Your supervisor gives you a bundle of \$10 bills, a bundle of \$20 bills, and \$200.00 in coins. How much cash do you now have on hand (including float)?

## ► Level 3

1.17 Use the following information to answer questions a and b below.

You are a Senior Cashier. You began your shift with a \$2,500.00 float. Your supervisor has given you one additional bundle of \$100 bills and one bundle of \$20 bills because she has noticed that the casino is very busy. You have received \$4,500.00 from guests in exchange for chips, and you have paid out the following:

Cash for 3 yellow chips

Jackpot winnings of \$1,830.00 and \$2,200.00

After these large payouts, the supervisor gives you another bundle of \$50 bills.

- a) How much cash do you have at your booth?
- b) Three hours later, your cash tape shows that you have paid out 2 more jackpots, \$1,150.00 and \$700.00, both won at table games. How much cash do you have on hand now?

1.18 Use the information below to answer questions a – d.

You are the bank supervisor. You are responsible for counting and reconciling the cash from 8 booths. You decrease each booth at least once per evening, but more often when the casino is busy. The table below shows the cash, tokens, chips and TITO receipts you have collected during 3 different rounds of collections. (The current exchange rate for \$1 US is \$1.25 CDN.)

### Collection #1

| Booth # | Chips                            | Tokens        | TITO                           | Cash  |
|---------|----------------------------------|---------------|--------------------------------|---|
| 1.      | 35 orange<br>22 white<br>4 black | 15 @ \$5 each | \$11.50<br>\$14.00<br>\$7.25   | 1 bag toonies<br>8 rolls quarters<br>1 bundle \$10 bills<br>1 bundle \$20 bills |
| 2.      | 48 orange<br>20 green<br>18 red  | 13 @ \$5 each | \$24.00<br>\$30.00<br>\$125.00 | 2 bags loonies<br>1 bag nickels<br>2 bundles \$5 bills<br>1 bundle \$10 bills   |
| 3.      | 27 orange<br>21 white<br>17 red  | 24 @ \$5 each | \$95.00<br>\$38.00             | 11 rolls quarters<br>3 bundles \$5 bills  |

### Collection #2

| Booth # | Chips                             | Tokens        | TITO                                      | Cash   |
|---------|-----------------------------------|---------------|---|--|
| 5.      | 27 orange<br>31 white             | 6 @ \$5 each  | \$46.00<br>\$28.00                        | 1 bag loonies<br>1 bag toonies<br>2 bundles \$10 bills<br>\$200.00 US        |
| 7.      | 8 green<br>7 black                | 7 @ \$5 each  | \$95.00<br>\$27.00<br>\$33.00<br>\$105.00 | 1 bag quarters<br>1 bag toonies<br>1 bundle \$5 bills<br>1 bundle \$10 bills |
| 8.      | 45 orange<br>38 white<br>18 green | 11 @ \$5 each | \$25.50<br>\$35.15<br>\$27.95             | 1 bag quarters<br>1 bag nickels<br>1 bundle \$20 bills<br>\$140.00 US        |

### Collection #3

| Booth # | Chips  | Tokens        | TITO  | Cash   |
|---------|--|---------------|---|--|
| 4.      | 55 orange<br>35 white<br>44 red              | 23 @ \$5 each | \$28.50<br>\$43.50<br>\$60.00                       | 2 rolls toonies<br>5 rolls loonies<br>1 bag nickels<br>2 bundles \$5 bills   |
| 5.      | 33 orange<br>27 green                        | 9 @ \$5 each  | \$13.00<br>\$26.00<br>\$11.00                       | 4 rolls loonies<br>3 rolls quarters<br>3 bundles \$5 bills<br>\$500.00 US  |
| 6.      | 125 orange<br>90 white<br>75 green<br>40 red | 17 @ \$5 each | \$24.00<br>\$26.50<br>\$34.00<br>\$52.00<br>\$88.00 | 1 bag loonies<br>1 bag nickels<br>4 rolls toonies<br>2 bundles \$5 bills<br>2 bundles \$10 bills<br>1 bundle \$20 bills<br>\$350.00 US |

- a) Count and record all cash collected. What is the total value of coins collected? Of paper money?
- b) Count and record all chips collected. What is the total value of chips collected?
- c) Count and record all TITO receipts collected. What is their total value?
- d) What is the total value of chips, tokens, TITO receipts and cash collected?

1.19 Use the following information to answer questions a – d below.

You began your shift at your cashier's booth with an opening float of \$1,800.00. An hour later, your supervisor got ready for a busy shift, and gave you a bundle of \$50 bills, a bundle of \$20 bills and a bundle of \$10 bills. You have received \$3,250.00 from guests in cash in exchange for chips, and you have made the following payouts:

Cash for 35 white chips  
 Cash for 50 green chips  
 Cash for 40 red chips  
 Jackpot winnings – total of \$575.00

After these payouts, your supervisor gives you 2 bundles of \$20 bills, and a bundle of \$5 bills.

- a) How much cash have you received since your shift began, from all sources?
- b) How much have you paid out in winnings?
- c) How much cash should you now have on hand at your booth?
- d) A short time later, you cashed in 75 red chips, 25 green chips and a TITO receipt for \$250.00 for a guest. How much cash do you have on hand now?

1.20 As a supervisor, you are responsible for making sure that cashiers have enough cash on hand to process all transactions. However, you are also responsible for making sure that the cash at the cashiers' wickets is decreased regularly. How would you respond to the following situation?

One of the cashiers began her shift with a \$450.00 cash float. Two hours later, you decreased her cash by \$6,000.00, and then two hours after that you decreased her cash again by \$11,200.00. According to your schedule, you are supposed to withdraw cash from her wicket every 2 hours.

## Task 2:

# Calculate the Cash Value of Chips

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

2.1 Give the values of each of the chip colors listed below:

Orange

White

Red

Green

Black

Yellow

2.2 One guest would like to buy \$40.00 worth of orange chips. How many do you give her?

2.3 A guest is cashing in the following: 33 orange chips, 11 white and 6 black. How much cash do you give him?

2.4 A guest asks for \$100.00 in black chips. How many do you give him?

2.5 A guest asks for \$50.00 in orange and white chips. Give two different ways that you can accommodate his request.

## Task 3:

# Check Calculations Done by Someone Else

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

3.1 You count the coins in your booth at the beginning of your shift. You have the following:

6 rolls of toonies

1 bag of loonies

12 rolls of quarters

1 bag of nickels

1 bag of pennies

The computer print out indicates that you should have \$1,470.00 in coins. Do you have the correct amount? If not, what is the discrepancy between your cash and the computer record?

3.2 Verify the following totals. Determine which one is incorrect. Is there a quick way to find an error in this type of calculation?

|               |  |                  |
|---------------|--|------------------|
| TITO receipts | \$11.50, \$25.25, \$35.75, \$125.00, \$145.00  | Total = \$342.50 |
| TITO receipts | \$42.50, \$111.25, \$66.00, \$340.00, \$215.00 | Total = \$774.75 |
| TITO receipts | \$23.50, \$35.75, \$242.00, \$264.25, \$222.50 | Total = \$787.75 |

3.3 There is an error in the following list of totals. Can you find it?

|                  |            |
|------------------|------------|
| 1 bag toonies    | \$2,000.00 |
| 1 bag loonies    | \$1,000.00 |
| 1 bag quarters   | \$250.00   |
| 1 bag nickels    | \$50.00    |
| 3 rolls dimes    | \$25.00    |
| 10 rolls pennies | \$5.00     |

## Task 4: Convert Currency

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

- 4.1 The exchange rate for the day has been given as 25%. A guest comes to your booth with \$150 US. How much cash Canadian do you give him?
- 4.2 The exchange rate has been given as 30%. How much Canadian cash do you give in exchange for the following:
- \$200.00 US
  - \$350.00 US
  - \$118.00 US
  - \$575.00 US
  - \$880.00 US

## ► Level 2

4.3 The current rate of exchange is \$1.25. Calculate the Canadian cash you would give in exchange for the following items:

|         |                          |
|---------|--------------------------|
| TITO    | \$35.00, \$12.50, \$7.00 |
| US cash | \$79.00                  |

## Task 5:

## Estimate Amount of Money

Performing this task involves the following types of math:

- Estimation Strategies

## ► Level 2

5.1 It is very late on a Saturday evening. You have coins, a few \$5 bills, a bundle of \$10 bills and a few \$20 bills. The casino is full, and the games are in full swing. You notice that you have 10 people in line, and they are all holding black chips. How much money should you request for your booth from the bank supervisor?

5.2 On a very busy night, you estimate the cash at your station. You have:

An assortment of coins – you estimate that altogether you have less than \$30.00

A bundle of \$5 bills

A bundle of \$20 bills

Approximately \$200.00 in \$10 bills

There are still more than 5 hours left in your shift. How much cash should you request from your supervisor?



**C**ompare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Numeracy Foundation section and try the activities again.

## Task 1: Count Cash

### ► Level 1

1.1

- a) \$1,000.00
- b) \$2,000.00
- c) \$50.00
- d) \$100.00
- e) \$250.00
- f) \$500.00
- g) \$4,000.00
- h) \$3,000.00

1.2 There are 1000 coins of any denomination in a sealed bag.

1.3

- a) \$2,000.00
- b) \$30.00
- c) \$2,000.00
- d) \$5,000.00
- e) \$50.00
- f)  $5 \times \$25.00 = \$125.00$
- g)  $10 \times \$0.50 = \$5.00$
- h)  $12 \times \$5.00 = \$60.00$
- i)  $20 \times \$1.00 = \$20.00$
- j)  $16 \times \$100.00 = \$1,600.00$

1.4 There are 100 bills in a bundle.

1.5

- a) \$16.00
- b) \$13.00
- c) \$50.00
- d) \$500.00
- e) \$1,000.00
- f) \$115.00
- g) \$50.50
- h) Total = \$1,744.50

1.6 18 \$5 bills

1.7

- a)  $\$1,000.00 + \$2,000.00 = \$3,000.00$
- b)  $\$2,000.00 + \$175.00 + \$20.00 = \$2,195.00$
- c)  $\$850.00 + \$50.00 = \$900.00$
- d)  $\$565.00 + \$40.00 = \$605.00$
- e) 3 bags of toonies is \$6,000.00 and 4 rolls of loonies (at \$25/roll) is \$100.00 = \$6,100.00

1.8  $\$3,000.00 + \$2,195.00 + \$605.00 = \$5,800.00$

1.9 \$7,950.73

1.10

- a) \$3.25
- b) \$23.30
- c) \$11.25
- d) \$1,050.00
- e) \$375.00
- f) \$3,340.00
- g) \$5,300.00
- h) \$4,350.00

## ► Level 2

1.11 Total cash = \$133.25

1.12

- a) Receipts have been  $\$7,555.50 - \$600 = \$6,955.50$
- b) \$500.00
- c)  $\$7,555.50 - \$500.00 = \$7,055.50$

1.13 7 tokens (@ \$5 each) = \$35.00. TITO receipts = \$87.75. 40 Orange chips = \$20.00. Total = \$142.75

1.14

- a) \$3,259.00
- b) \$1,945.00
- c) \$1,814.00

1.15

- a) \$10,492.00
- b) \$514.30
- c) Cash = \$1,410.30 (including float), TITO = \$206.00
- d) Total value of all items = \$1,616.30

1.16

- a) Total cash on hand before deposit = \$7,821.76
- b) Cash taken in since beginning of shift = \$7,321.76
- c) Deposit total = \$7,034.70
- d) After deposit cash on hand = \$787.06
- e) Total cash on hand after supervisor adds cash to wicket = \$3,987.06

### ► Level 3

1.17

- a) \$16,970.00
- b) \$15,120.00

1.18

- a) Coin = \$11,445.00  
Cash = \$19,500.00  
US cash = \$1,190.00 (converts to \$1,487.50 CDN)
- b) Chips = \$5,829.50
- c) TITO = \$1,173.85
- d) Total of all currency = \$37,948.35 plus \$1,487.50 = \$39,435.85

1.19

- a) Not including float, cash received from all sources = \$15,750.00  
Total cash including float = \$17,550.00
- b) Paid out in winnings = \$2,060.00
- c) Cash on hand after payouts should be \$15,490.00
- d) After cashing in chips, cash at wicket should be \$14,490.00

1.20 This cashier is very busy, and the supervisor may want to decrease the cash at her wicket more often (perhaps once per hour rather than every 2 hours).

## Task 2: Calculate the Cash Value of Chips

### ► Level 1

2.1

Orange chips are worth \$0.50  
White chips are worth \$1.00  
Red chips are worth \$5.00  
Green chips are worth \$25.00  
Black chips are worth \$100.00  
Yellow chips are worth \$1,000.00

2.2 Orange chips are worth \$0.50 each. You should give her 80 chips.

2.3 Orange = \$16.50, white = \$11.00 and black = \$600.00. Total value = \$627.50

2.4 One

2.5 One possibility is 40 white + 20 orange. Another possibility is 30 white and 40 orange.

## Task 3: Check Calculations Done By Someone Else

### ► Level 1

3.1 \$300.00 in toonies, \$1,000.00 in loonies, \$120.00 in quarters, \$50.00 in nickels, \$10.00 in pennies = \$1,480.00 in total. This does not balance with the computer print-out. Cash is higher by \$10.00.

3.2 c is incorrect. You can tell by looking at the cents. The total should be an even dollar amount.

3.3 3 rolls of dimes are worth \$5.00 each or a total of \$15.00 (not \$25.00)

## Task 4: Convert Currency

### ► Level 1

4.1  $150 \times \$1.25 = \$187.50$  CDN

4.2

- a)  $\$200.00$  US =  $\$260.00$  CDN
- b)  $\$350.00$  US =  $\$455.00$  CDN
- c)  $\$118.00$  US =  $\$153.40$  CDN
- d)  $\$575.00$  US =  $\$747.50$  CDN
- e)  $\$880.00$  US =  $\$1,144.00$  CDN

### ► Level 2

4.3  $\$54.50$  for TITO and  $(\$79 \times 1.25) = \$98.75$  cash. Total given to guest =  $\$153.25$

## Task 5: Estimate Amount of Money

### ► Level 2

- 5.1 You will need at least 1 bundle of \$50's and 1 bundle of \$20's. More may be required.
- 5.2 You have a total of about \$2,700.00. You may wish to ask for one bundle of \$5's and two bundles of \$10's. You may also want a roll of coins of each denomination.

# Job Family Section

## Customer Services/ Administration



# Introduction

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**T**his section deals with the Numeracy skills that Customer Service employees need to know. Employees working in this area use a large variety of math skills, such as measuring signs, calculating percentages and discounts, and recording cash flow.

These skills are important for Customer Service employees because working with money requires that employees understand decimals and a variety of mathematical functions. They also need to be able to plan for events, which involves estimating, determining probability and taking measurements. Accuracy and comfort in dealing with money/monetary amounts are critical to the success of both the casino and the employees.

In this section, you will practice how to:

- Read and use measurement instruments
- Calculate and use percentages for events and reports
- Read and record schedule times
- Use rates to make comparisons and calculate discounts
- Estimate quantities, space and time
- Measure amounts of materials
- Read, calculate and record money totals
- Use probability to predict guests' preferences
- Calculate fractions of hours
- Use equations and formulas to calculate payouts
- Record and count cash

Now it's your turn. Try these activities to practice the Numeracy skills you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundation Section: Math

## Task 1:

# Read and Use Measurement Instruments

Performing this task involves the following types of Numeracy:

- Read metric measurements

### ► Level 1

1.1 Look at the pressure gauge below.



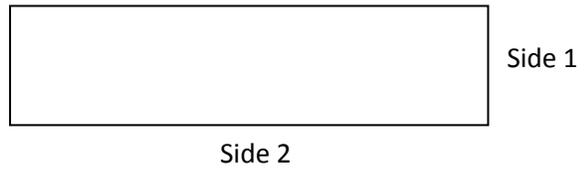
- What is the pressure in \_\_\_\_\_ bar?
- In \_\_\_\_\_ psi?

1.2 Look at the temperature gauge. What is the temperature?



1.3 Measure the dimensions of the following signs. Show your answer in centimetres.

a)



Side 1: \_\_\_\_\_

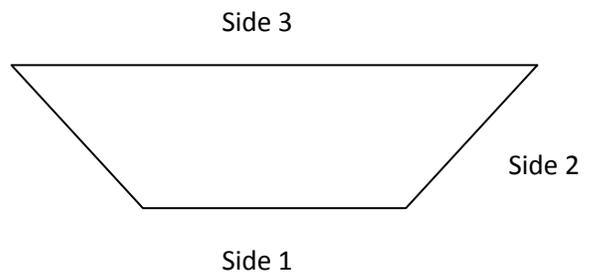
Side 2: \_\_\_\_\_

b)



Side 1: \_\_\_\_\_

Side 2: \_\_\_\_\_



Side 1: \_\_\_\_\_

Side 2: \_\_\_\_\_

Side 3: \_\_\_\_\_

## Task 2:

# Calculate and Use Percentages for Events and Reports

Performing this task involves the following types of Numeracy:

- Work with percentages

### ► Level 1

When planning for special events, you need to estimate the amount of food that the guests will eat. You also need to estimate the beverages they will drink.

- 2.1 You are planning the food and beverages for a lunch meeting at the casino. Your manager tells you that 75% of the guests normally drink coffee and 94% of the guests drink bottled water, while 100% of the guests will eat the meal and 50% of the guests will have dessert. You are expecting 16 guests at the lunch meeting. Complete the following order form.

| Item              | Quantity |
|-------------------|----------|
| Coffee servings:  | _____    |
| Bottles of water: | _____    |
| Hot lunches:      | _____    |
| Desserts:         | _____    |

- 2.2 You are hosting an event with a bus tour. The event is a small appetizer and beverage party before bingo. Your manager tells you that the budget for food and beverages at the event is \$500 dollars. She also tells you that 70% of the budget should go towards food and 30% towards beverages.

- a) How much money do you have to spend on food for the event?
- b) How much can you spend on beverages?

- 2.3 The casino is hosting a dance competition event. The event has sold 40 tickets. You expect 95% of the ticket holders to show up. How many people do you expect?

► Level 2

2.4 You receive the guest evaluation results from a concert event that your casino hosted. Look at the results below.

E - Excellent    VG - Very Good    F - Fair    P - Poor    NA - Not Applicable

**Concert: The Waywards**

| Guest Name | Rating |
|------------|--------|
| Cindy      | E      |
| Breanne    | VG     |
| Gary       | VG     |
| Jameel     | VG     |
| Peter      | E      |
| Sundeep    | E      |
| Natalia    | VG     |
| Leslie     | VG     |
| Raymond    | VG     |
| Lise       | F      |

What percentage of guests rated the concert as very good?

2.5 The upcoming band that is scheduled to play at the casino this weekend is offering you, the Executive Host, discounted merchandise to purchase for preferred guests. Look at the price list below.

| ITEM                        | Discounted Unit Price | Total Price     |
|-----------------------------|-----------------------|-----------------|
| 12 men's t-shirts (size M)  | \$8.99                | \$107.88        |
| 8 men's t-shirts (size L)   | \$8.99                | \$71.92         |
| 12 men's t-shirts (size XL) | \$8.99                | \$107.88        |
| 10 unisex baseball caps     | \$6.59                | \$ 65.90        |
| 20 ladies t-shirts (size M) | \$8.49                | \$169.80        |
| 14 ladies t-shirts (size M) | \$8.99                | \$125.86        |
| <b>Subtotal</b>             |                       | <b>\$649.24</b> |

Are the price extensions correct?

2.6 You just received an e-mail from the band stating that there are further price adjustments. Calculate the new price and the correct item total for the following items:

- a) Ladies t-shirts (size M) are an additional 12% below cost
- b) Men's t-shirts (size XL) are an additional 4% below cost
- c) Unisex baseball caps are an additional 7% below cost

## Task 3:

# Read and Record Schedule Times

Performing this task involves the following types of Numeracy:

- Use military time

### ► Level 1

3.1 The Casino Host's shift time was from 0830 to 1445. How many hours did the Casino Host work?

---

3.2 The Valet Attendant's shift time was from 1530 to 2245. How many hours did the Valet Attendant work?

---

3.3 The Switchboard Operator's shift time was from 1000 to 1645. How many hours did the Switchboard Operator work?

---

### ► Level 2

3.4 The draw times for this week's casino promotions are to be scheduled 3 hours apart starting at 10:00 a.m. There are 6 draws per day. List the daily draw times in military time.

---

3.5 The draw times for this week's casino promotions are to be scheduled 2 hours apart starting at 09:00 a.m. There are 7 draws per day. List the daily draw times in military time.

---

## Task 4:

# Use Rates to Make Comparisons and Calculate Discounts

Performing this task involves the following types of Numeracy:

- Do rate calculations

### ► Level 1

- 4.1 A Casino Host would like to distribute invitations for the casino's Super Summer Sunday events. The Manager has decided to give out 3 invitations per guest. The Casino Host has 35 guests on her list. How many invitations does she need?
- 4.2 A Casino Host is planning a January promotion with his manager. The manager would like to give away 6 complimentary concert tickets to guests for each concert in January. There are 4 concerts planned in January. How many complimentary tickets will the Casino Host give away in total?
- 4.3 The Casino Host is planning for the week. He is expecting 14 bus tours. He knows that each bus will have at least 40 people. How many people can the Casino Host expect at the casino from bus tours that week?

### ► Level 2

- 4.4 A local soccer team is hosting a bingo fundraiser. The casino requires that the soccer team provide one volunteer for every \$150 dollars in fundraising money. The casino plans to fundraise \$1,500 for the soccer team. How many volunteers are required?

4.5 Here is the bill for an event. Complete the final tax calculations to get the total payable.

| Item (unit)            | Quantity | Cost/Unit | Total Cost per Item |
|------------------------|----------|-----------|---------------------|
| Mixed sandwiches (doz) | 4        | \$18.45   | \$73.80             |
| Coffee (urn)           | 2        | \$15.00   | \$30.00             |
| Cookies (doz)          | 3        | \$5.50    | \$16.50             |
| Juice (boxes)          | 30       | \$0.75    | \$22.50             |
| Sub-total              |          |           | \$142.80            |
| GST (5%)               |          |           | ?                   |
| PST (7%)               |          |           | ?                   |
| TOTAL                  |          |           | ?                   |

4.6 Here is the bill for an event. There is a group discount of 10% applied to the total cost per item. Calculate the discounted total cost per item.

| Item (unit)                 | Quantity | Cost/Unit | Total Cost per Item | Discounted Total Cost per Item |
|-----------------------------|----------|-----------|---------------------|--------------------------------|
| Chicken Kiev Dinner (plate) | 72       | \$16.45   | \$1184.40           |                                |
| Coffee (urn)                | 4        | \$15.00   | \$60.00             |                                |
| Cheesecake (doz)            | 6        | \$36.50   | \$219.00            |                                |
| Water (bottles)             | 75       | \$0.75    | \$56.25             |                                |

## Task 5: Estimate Quantities, Space and Time

Performing this task involves the following types of Numeracy:

- Estimate

### ► Level 1

5.1 A dinner reception is taking place this evening. The Casino Host needs to estimate the time at which to serve the courses for the meal. Here is what the organizer (or another word, I don't think the guest would be explaining this) explained to the host:

- guests will arrive at 1700
- guests would like an hour to mingle, eat appetizers and have drinks
- guests will require an hour for their dinner
- the 30 minutes after dinner should be set aside for speeches
- dessert should be served after the speeches

a) For what time do you tell the kitchen to have dinner prepared?

b) For what time do you tell the kitchen to have the dessert prepared?

5.2 Look at the event attendance sheet below. What is the estimated casino attendance on Canada Day?

| Date      |        | Daily casino Attendance (estimated) | Events/ Promotions/ Entertainment            |
|-----------|--------|-------------------------------------|--|
| Sunday    | 27-Jun | 2,214                               |  |
| Monday    | 28-Jun | 1,893                               |  |
| Tuesday   | 29-Jun | 2,563                               | Poker tournament                             |
| Wednesday | 30-Jun | 2,783                               | Buffet Special                               |
| Thursday  | 01-Jul | 3,379                               | Canada Day Casino Celebration - hourly draws |
| Friday    | 02-Jul | 2,966                               |  |
| Saturday  | 03-Jul | 3,132                               |  |
| Sunday    | 04-Jul | 2,518                               |  |
| Monday    | 05-Jul | 1,796                               |  |
| Tuesday   | 06-Jul | 2,456                               | Poker tournament                             |
| Wednesday | 07-Jul | 2,652                               | Buffet Special                               |
| Thursday  | 08-Jul | 1,859                               |  |
| Friday    | 09-Jul | 3,014                               | Shania Twain Tribute Show                    |
| Saturday  | 10-Jul | 3,253                               |  |
| Sunday    | 11-Jul | 3,423                               | "In it to Win It!" Car Draw                  |
| Monday    | 12-Jul | 1,986                               |  |
| Tuesday   | 13-Jul | 2,604                               | Poker tournament                             |
| Wednesday | 14-Jul | 2,755                               | Buffet Special                               |
| Thursday  | 15-Jul | 1,752                               |  |
| Friday    | 16-Jul | 2,963                               |  |
| Saturday  | 17-Jul | 3,198                               |  |

- 5.3 You are responsible for ordering Canadian flag pins for your customers for Canada Day celebrations. Using the table on the previous page, how many pins should you order? Note that the pin company needs the order to be rounded off to the nearest 100.

► **Level 2**

- 5.4 A Casino Host is planning the lunch for a bus tour. The host is expecting 45 guests. In general, 5% of guests are vegetarian, and 2% have allergies to nuts, dairy and shellfish.

- a) Approximately how many people may be vegetarian?
- b) Approximately how many people may be allergic to nuts, dairy and shellfish?
- c) Circle the meal plan that best fits this group.

**Meal Plan A**

35 servings – beef and barley soup  
10 servings – vegetable soup  
35 servings – chicken Kiev (with potato and vegetable)  
10 servings – shrimp jambalaya (with rice and vegetable)

**Meal Plan B**

40 servings – beef and barley soup  
10 servings – vegetable soup  
35 servings – chicken Kiev (with potato and vegetable)  
10 servings – tofu stroganoff (with potato and vegetable)

**Meal Plan C**

35 servings – beef and barley soup  
10 servings – vegetable soup  
35 servings – chicken Kiev (with potato and vegetable)  
10 servings – tofu stroganoff (with potato and vegetable)

- 5.5 You are planning an event for 12 guests. The following table shows the costs of the event.

| COMP AREA       | COST   |
|-----------------|--------|
| Concert tickets | \$540  |
| Meals           | \$800  |
| Beverages       | \$450  |
| TOTAL COST      | \$1790 |

You expect each guest to spend, on average, \$300. What do you estimate the return on the investment will be?

## Task 6: Measure Amounts of Materials

Performing this task involves the following types of Numeracy:

- Calculate area

### ► Level 1

- 6.1 You have to cover a table with wrapping paper for a special promotion display. Here are the dimensions of the table:

1.25 m wide

5.50 m long

What area of wrapping paper do you need? Round off your answer to the nearest tenth.

- 6.2 You are marking out an area of wall for a new mural. The dimensions are 200 cm by 400 cm. The mural artist needs to know the area of space she will be painting. What do you tell her?

- 6.3 The casino has decided to refurbish the Palms room. They are adding a new curtain rod so that the size of the room can be changed, for example, made smaller for smaller events. The curtain must reach from one wall across to the other wall, and go from the ceiling to the floor. The dimensions are the following:

Distance from wall 1 to wall 2: 22 ft

Height from ceiling to floor: 12 ft

What area of material is required for the curtain?

## Task 7:

# Read, Calculate and Record Money Totals

Performing this task involves the following types of Numeracy:

- Use decimals

### ► Level 1

7.1 A Casino Host is giving out gold cards to a bus tour for the guests to play games in the casino. There are 52 people on the bus and each guest receives \$20.00 on their gold card. What is the total value of gold card dollars that the host gives out?

7.2 The Valet Driver receives his pay stub. Determine whether the net income is correct.

| Employee#       | Employee Name |                | S.I.N.            | Employer        |             |             |          |
|-----------------|---------------|----------------|-------------------|-----------------|-------------|-------------|----------|
| 17 23 15        | Debora Carmen |                |                   | Barbara Furtake |             |             |          |
| Rate: Hourly \$ |               |                | Ending: 27 Nov 10 |                 | Chq #: 1583 |             |          |
|                 | This Pay      |                | This Pay          |                 | This Pay    |             | This Pay |
| Gross income    | \$659.95      | El deductions: | \$123.50          | CPP payments:   | \$185.25    | Net income: | \$351.20 |

Determine whether the net income is correct.

7.3 A Guest Services Representative worked the following shifts:

#### Week 1

Mon: 7.5 hours  
Tue: 7.5 hours  
Wed: 6 hours  
Thu: 6.5 hours  
Sat: 8 hours

#### Week 2

Mon: 7 hours  
Tue: 7.5 hours  
Wed: 6.5 hours  
Thu: 6 hours  
Sat: 7.75 hours

How many hours did the Guest Services Representative work for the two weeks?

- 7.4 A Switchboard Operator worked 73 hours over a two-week period. She is paid \$10.75 per hour. How much should she be paid before taxes are deducted?

► Level 2

The Executive Host has to do an inventory of complimentary gifts and coupons. Look at the inventory data she entered in the table below. Use the table to answer the questions that follow.

| Complimentary Gifts |     |        | Coupons  |     |        |
|---------------------|-----|--------|----------|-----|--------|
| Gift                | Par | Actual | Value    | Par | Actual |
| Beer/wine/liquor    | 25  | 19     | \$25.00  | 30  | 21     |
| Lunch entrée        | 20  | 12     | \$40.00  | 25  | 18     |
| Dinner entrée       | 15  | 4      | \$50.00  | 15  | 14     |
| One-night stay      | 10  | 9      | \$100.00 | 10  | 6      |

- 7.5 What is the value of \$25.00 coupons currently in the inventory?
- 7.6 What value of \$40.00 coupons was used since the last inventory?
- 7.7 What is the total value of coupons currently in the inventory?
- 7.8 What is the total value of coupons when the inventory levels are on par?

► Level 3

7.9 Look at the screenshots that were taken from a casino guest management system on this and the next page. Complete the following table with the actual money spent by the guests.

| Guest Name | Date and Time | Point Balance |
|------------|---------------|---------------|
|            |               |               |
|            |               |               |
|            |               |               |
|            |               |               |

Patron Management - Player - MR. JOHN SMITH 66027743

Player Information

MR. JOHN SMITH  
 Phone #: (204) 555-5432  
 Email: Jsmith123@email.com  
 kt. Auth.: <not assigned>  
 Cards: 1  
 Enrolled: 07/14/2009 02:20  
 Source: Grace DeLeon

NO 10

Promotions

| Link ID | Name           | Point Balance   | Comp Balance |
|---------|----------------|-----------------|--------------|
| 667265  | MR. JOHN SMITH | 1,340 (\$13.40) | 0.00         |
| Totals  |                | 1,340           | 0.00         |

Patron Management - Player - MR. Henri Bourasseau 66027742

Player Information

MR. Henri Bourasseau  
 Phone #: (204) 555-7583  
 Email: HB204@email.com  
 kt. Auth.: <not assigned>  
 Cards: 1  
 Enrolled: 07/14/2009 14:30  
 Source: Grace DeLeon

NO 10

Promotions

| Link ID | Name                 | Point Balance   | Comp Balance |
|---------|----------------------|-----------------|--------------|
| 667265  | MR. Henri Bourasseau | 1,045 (\$10.45) | 0.00         |
| Totals  |                      | 1,045           | 0.00         |

(Continue question on the next page.)

Patron Management - Player - MRS. Angela Karpinski 66027741

Common Links

Common Player Tasks

- Find Player: Find an existing player. A variety of criteria may be used to find the player.
- Enroll Player: Create a new player. This will create a new player that can participate in club activities.

Personal Tasks

Add your own common task through the program options.

Player Information

MRS. Angela Karpinski

Phone #: (204) 555-2359

Email: AngieKar@email.com

Mkt. Auth.: <not assigned>

Cards: 1

Enrolled: 07/14/2009 12:45

Source: Grace DeLeon

NO ID

Promotions

| Link ID | Name                  | Point Balance   | Comp Balance |
|---------|-----------------------|-----------------|--------------|
| 668145  | MRS. Angela Karpinski | 2,540 (\$25.40) | 0.00         |
| Totals  |                       | 2,540           | 0.00         |

Patron Management - Player - MR Gunther Sinclair 66027740

Common Links

Common Player Tasks

- Find Player: Find an existing player. A variety of criteria may be used to find the player.
- Enroll Player: Create a new player. This will create a new player that can participate in club activities.

Personal Tasks

Add your own common task through the program options.

Player Information

MR Gunther Sinclair

Phone #: (204) 555-1232

Email: guntherboy@email.com

Mkt. Auth.: <not assigned>

Cards: 1

Enrolled: 07/14/2009 18:30

Source: Grace DeLeon

NO ID

Promotions

| Link ID | Name                | Point Balance   | Comp Balance |
|---------|---------------------|-----------------|--------------|
| 667212  | MR Gunther Sinclair | 1,800 (\$18.00) | 0.00         |
| Totals  |                     | 1,800           | 0.00         |

## Task 8: Use Probability to Predict Guests' Preferences

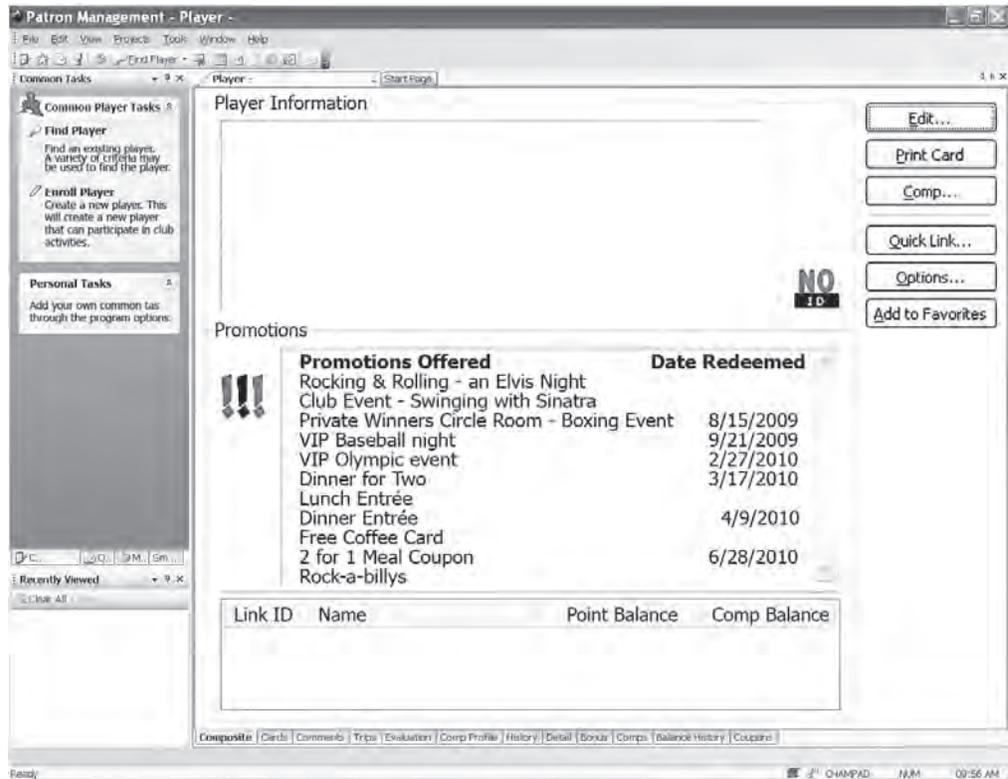
Performing this task involves the following types of Numeracy:

- Determine probability

### ► Level 1

Look at the following screenshot from a casino guest management system. Using the information from the system, answer the following questions.

*(Continue question on the next page.)*



8.1 Predict which of the following concerts the guest is most likely to attend. Circle one answer.

- Jazz and blues festival
- The Calgary Cowgirl band
- Rock through the ages

8.2 Predict which complimentary gift the guest is likely to enjoy the most. Circle one answer.

- Free lunch entree
- Free dinner entrée
- Complimentary bottomless cup of coffee

8.3 Predict which event the guest is mostly likely to attend. Circle one answer.

- Private room – VIP viewing of UFC16
- VIP access to Lionel Richie – the soft rock event
- King of Rock – the legend of ZZ top (members only event)

► Level 2

Look at the spreadsheet below. It shows the date and estimated attendance for various events/promotions/entertainment. Use the spreadsheet to answer the questions that follow.

| Date      |        | Daily Casino Attendance (estimated) | Events/Promotions/Entertainment              |
|-----------|--------|-------------------------------------|--|
| Sunday    | 27-Jun | 2,214                               |  |
| Monday    | 28-Jun | 1,893                               |  |
| Tuesday   | 29-Jun | 2,563                               | Poker tournament                             |
| Wednesday | 30-Jun | 2,783                               | Buffet Special                               |
| Thursday  | 01-Jul | 3,379                               | Canada Day Casino Celebration - hourly draws |
| Friday    | 02-Jul | 2,966                               |  |
| Saturday  | 03-Jul | 3,132                               |  |
| Sunday    | 04-Jul | 2,518                               |  |
| Monday    | 05-Jul | 1,796                               |  |
| Tuesday   | 06-Jul | 2,456                               | Poker tournament                             |
| Wednesday | 07-Jul | 2,652                               | Buffet Special                               |
| Thursday  | 08-Jul | 1,859                               |  |
| Friday    | 09-Jul | 3,014                               | Shania Twain Tribute Show                    |
| Saturday  | 10-Jul | 3,253                               |  |
| Sunday    | 11-Jul | 3,423                               | "In it to Win It!" Car Draw                  |
| Monday    | 12-Jul | 1,986                               |  |
| Tuesday   | 13-Jul | 2,604                               | Poker tournament                             |
| Wednesday | 14-Jul | 2,755                               | Buffet Special                               |
| Thursday  | 15-Jul | 1,752                               |  |
| Friday    | 16-Jul | 2,963                               |  |
| Saturday  | 17-Jul | 3,198                               |  |

- 8.4 On which dates would the casino require the highest number of staff? What is the common factor that all these dates share?
- 8.5 On which dates would the casino require the lowest number of staff?
- 8.6 If you know that 60% of the estimated guests buy buffet meals, how many servings would you tell the kitchen to prepare for July 14? Round off your answer to the nearest 10.

## Task 9:

# Calculate Fractions of Hours

Performing this task involves the following types of Numeracy:

- Work with fractions

### ► Level 2

- 9.1 A Valet Driver worked 6 full hours and a half an hour. Show the numbers of hours using fractions.
- 9.2 A Casino Host worked 5 hours and 15 minutes. Write the hours using fractions.
- 9.3 A Clerk Typist worked 3 and a half shifts. Write the total number of shifts using fractions.

## Task 10:

# Use Equations and Formulas to Calculate Payouts

Performing this task involves the following types of Numeracy:

- Use algebra formulas

### ► Level 1

Look at the Payout Chart below and use it to answer the questions below.

| <b>Payout Chart</b>    |                          |                          |
|------------------------|--------------------------|--------------------------|
| <b>Winning Hands</b>   | <b>Basic Game Payout</b> | <b>Bonus Game Payout</b> |
| Royal Flush            | 1,000 to 1               | \$20,000                 |
| Straight Flush         | 200 to 1                 | \$2,000                  |
| Four of a Kind         | 50 to 1                  | \$100                    |
| Full House             | 11 to 1                  | \$75                     |
| Flush                  | 8 to 1                   | \$50                     |
| Straight               | 5 to 1                   | \$25                     |
| Three of a Kind        | 3 to 1                   | \$8                      |
| Two Pair               | 2 to 1                   | \$4                      |
| Pair of Tens or better | 1 to 1                   | N/A                      |

- 10.1 A customer bets \$15.00 on a round of Let It Ride. The customer wins with a Flush. How much money should the customer receive?
- 10.2 A customer bets \$5.00 on a round of Let It Ride. The customer wins with a Three of a Kind. How much money should the customer receive?
- 10.3 A customer bets \$12.00 on a round of Let It Ride. The customer wins with a Full House and, in addition, wins the Bonus Game. How much money should the customer receive?

► Level 2

Look at the diagram below and use it to answer the questions that follow.

| Inside bets  |     |                       |        |         |
|--------------|-----|-----------------------|--------|---------|
| Bet Name     | Ex. | Numbers to bet on     | Payout | Chances |
| Straight up  | A   | 30                    | 35:1   | 38:1    |
| Split Bet    | B   | 11 or 14              | 17:1   | 38:2    |
| Street Bet   | C   | 19, 20, 21            | 11:1   | 38:3    |
| Corner       | D   | 25, 26, 28, 29        | 8:1    | 38:4    |
| Five Numbers | E   | 0, 00, 1, 2, 3        | 6:1    | 38:5    |
| Line Bet     | F   | 4, 5, 6, 7, 8, 9      | 5:1    | 38:6    |
| Outside Bets |     |                       |        |         |
| Bet Name     | Ex. | Numbers to bet on     | Payout | Chances |
| Column       | G   | Set of column numbers | 2:1    | 38:12   |
| Dozen        | H   | 25 through 36         | 2:1    | 38:12   |
| Red or Black | I   | Red numbers           | 1:1    | 38:18   |
| Even or Odd  | J   | Odd numbers           | 1:1    | 38:18   |
| Low or High  | K   | 19 through 36         | 1:1    | 38:18   |

(Continue the question on the next page.)

10.4 Using  $x$  and  $y$  as variables, show the equation you would use to calculate the amount a customer wins on a line bet.

10.5 What amount should a customer receive if she places \$20.00 and wins on a corner?

10.6 Set up an equation that you would use to calculate the number of times a customer should win on a dozen bet if he plays 10 times.

## Task 11: Record and Count Cash

Performing this task involves the following types of Numeracy:

- Count cash

### ► Level 1

11.1 A guest would like to break a \$20 bill to get a \$10 and some loonies. What does the Valet Attendant give the guest?

- a) one \$10, one \$5, and five \$1s
- b) one \$10, four \$2s, and three \$1s
- c) one \$10, one \$5, one \$2, and four \$1s

11.2 The Valet Driver makes change for a customer. The customer gives her a \$10 and would like a \$5 and five \$1s. Record the transaction on the cash flow sheet.

| Denomination | Received | Given out |
|--------------|----------|-----------|
| \$20         |          |           |
| \$10         |          |           |
| \$5          |          |           |
| \$2          |          |           |
| \$1          |          |           |
|              |          |           |

11.3 The Guest Services Representative makes change for a customer. The customer gives her a \$20 and would like a \$10, \$5, two \$2s and a \$1. Record the transaction on the cash flow sheet.

| Denomination | Received | Given out |
|--------------|----------|-----------|
| \$20         |          |           |
| \$10         |          |           |
| \$5          |          |           |
| \$2          |          |           |
| \$1          |          |           |
|              |          |           |

► Level 2

11.4 At the start of his shift, the Valet Attendant receives the following float quantities. Enter the totals for each denomination and the grand total.

| Denomination | Quantity | Total |
|--------------|----------|-------|
| \$20         | 5        |       |
| \$10         | 8        |       |
| \$5          | 10       |       |
| \$2          | 20       |       |
| \$1          | 25       |       |
|              | TOTAL    |       |

11.5 At the end of his shift, the Valet Attendant has the following cash:

| Denomination | Quantity | Total |
|--------------|----------|-------|
| \$20         | 8        |       |
| \$10         | 12       |       |
| \$5          | 0        |       |
| \$2          | 5        |       |
| \$1          | 5        |       |
|              | TOTAL    |       |

Complete the totals and compare it to the starting float total to see if a discrepancy report is required.



**C**ompare your answers with the answers below. If you have gotten less than half of the answers correct, review the material in the related Foundations sections and try the activities again.

- 1.1 a) 280 bar
- b) 4100 psi

1.2 22oC

- 1.3 a) Side 1 1.6 cm, Side 2 6.3 cm
- b) Side 1 3.1 cm, Side 2 611.4 cm
- c) Side 1 3.5 cm, Side 2 62.6 cm, Side 3 7.0 cm

| 2.1 Item          | Quantity |
|-------------------|----------|
| Coffee servings:  | 12       |
| Bottles of water: | 15       |
| Hot lunches:      | 16       |
| Dessert:          | 8        |

2.2 \$350 for food and \$150 for beverages

2.3  $95\% \times 40 = 38$  people

2.4 60%

2.5 Yes, they are correct.

- 2.6 a) \$7.47 each, \$149.40 total
- b) \$8.63 each, \$103.56 total
- c) \$6.13 each, \$61.30 total

3.1 6.25 hours

3.2 7.25 hours

3.3 6.75 hours

3.4 1000  
1300  
1600  
1900  
2200  
0100

3.5 0900  
1100  
1300  
1500  
1700  
1900  
2100

4.1 105 invites

4.2 24 tickets

4.3 560 people

4.4 10 volunteers

4.5

| Item (unit)            | Quantity | Cost/Unit    | Total Cost per Item |
|------------------------|----------|--------------|---------------------|
| Mixed sandwiches (doz) | 4        | \$18.45      | \$73.80             |
| Coffee (urn)           | 2        | \$15.00      | \$30.00             |
| Cookies (doz)          | 3        | \$5.50       | \$16.50             |
| Juice (boxes)          | 30       | \$0.75       | \$22.50             |
|                        |          | Sub-total    | \$142.80            |
|                        |          | GST (5%)     | \$7.14              |
|                        |          | PST (7%)     | \$10.00             |
|                        |          | <b>TOTAL</b> | <b>\$159.94</b>     |

4.6

| Item (unit)                 | Quantity | Cost/Unit | Total Cost per Item | Discounted Total Cost per Item |
|-----------------------------|----------|-----------|---------------------|--------------------------------|
| Chicken Kiev Dinner (plate) | 72       | \$16.45   | \$1184.40           | \$1065.96                      |
| Coffee (urn)                | 4        | \$15.00   | \$60.00             | \$54.00                        |
| Cheesecake (doz)            | 6        | \$36.50   | \$219.00            | \$197.10                       |
| Water (bottles)             | 75       | \$0.75    | \$56.25             | \$50.62                        |

- 5.1 1800 for dinner and 1930 for dessert
- 5.2 3,379
- 5.3 3,400 pins
- 5.4 a) Approximately 3 people are vegetarians  
b) Approximately 1 person is allergic to nuts/dairy/shellfish  
c) Meal Plan B is the best choice since it allows for extras.

5.5 Approximately \$1,800

6.1 6.9 m<sup>2</sup>

6.2 80,000 cm<sup>2</sup>

6.3 264 square feet

7.1 \$1,040

7.2 It is correct.

7.3 70.25 hours

7.4 \$784.75

7.5 \$525

7.6  $\$280 (25-18) = 7 \times \$40$

7.7 \$2,545

7.8 \$3,500

7.9

| Guest Name            | Date and Time    | Point Balance |
|-----------------------|------------------|---------------|
| MR. JOHN SMITH        | 07/14/2009 02:20 | \$13.40       |
| MR. Henri Bourasseau  | 07/14/2009 14:15 | \$10.45       |
| MRS. Angela Karpinski | 07/14/2009 12:45 | \$25.40       |
| MR Gunther Sinclair   | 07/14/2009 18:30 | \$18.00       |

8.1 The following should be circled  
Rock through the ages

8.2 The following should be circled  
Free dinner entrée

- 8.3 The following should be circled  
Private room – VIP viewing of UFC16
- 8.4 All days expect guests totalling over 3,000, including: Jul 1, Jul 3, Jul 9, Jul 10, Jul 11, Jul 17
- 8.5 On days below 2,000, including: Jun 28, Jul 5, Jul 8, Jul 12, Jul 15
- 8.6  $60\% \times 2,755 = 1,653$  rounded off = 1,660 Note that it is rounded up because it is for food
- 9.1 6 ½ hours
- 9.2 5 ¼ hours
- 9.3 3½ shifts
- 10.1  $\$15.00 \times 8 = \$120$
- 10.2  $\$5.00 \times 3 = \$15.00$
- 10.3  $\$12.00 \times 11 = 132 + \$75 = \$207$
- 10.4  $x = \text{amount bet}$   
 $y = \text{payout amount}$   
  
Ratio 5:1  
  
 $x5 = y$
- 10.5  $\$20.00 \times 8 = \$160.00$
- 10.6 Chances are 38:12  
  
Customer plays 10 games  
 $X = \text{number of times a customer should win}$   
 $38/12 = 10/x$   
 $x = 10 \times 12$   
38  
 $x = 3.15$
- 11.1 a)

11.2

| Denomination | Received | Given out |
|--------------|----------|-----------|
| \$20         |          |           |
| \$10         | 1        |           |
| \$5          |          | 1         |
| \$2          |          |           |
| \$1          |          | 5         |
|              |          |           |

11.3

| Denomination | Received | Given out |
|--------------|----------|-----------|
| \$20         | 1        |           |
| \$10         |          | 1         |
| \$5          |          | 1         |
| \$2          |          | 2         |
| \$1          |          | 1         |
|              |          |           |

11.4

| Denomination | Quantity | Total |
|--------------|----------|-------|
| \$20         | 5        | \$100 |
| \$10         | 8        | \$80  |
| \$5          | 10       | \$50  |
| \$2          | 20       | \$40  |
| \$1          | 25       | \$25  |
|              | TOTAL    | \$295 |

11.5

| Denomination | Quantity | Total    |
|--------------|----------|----------|
| \$20         | 8        | \$160    |
| \$10         | 12       | \$120    |
| \$5          | 0        | \$0      |
| \$2          | 5        | \$10     |
| \$1          | 5        | \$5      |
|              | TOTAL    | \$295.00 |

No discrepancy report is required.

# Job Family Section

## Food and Beverage Service



# Introduction

**F**ood and beverage workers in the gaming industry use a wide range of math skills. Servers count cash and add up bills, including taxes and tips. They convert currency from US to Canadian and vice versa. Food preparation workers convert imperial to metric measurements back and forth, and adapt recipes to cook large quantities of food. Dining room workers estimate numbers of guests and space required. Those responsible for buying supplies compare costs and calculate the most economical purchases.

In this section, you will practice how to:

- Convert Currency
- Calculate Bills, Including Tips and Taxes
- Calculate Supply Needs
- Calculate Food and Beverage Costs and Profits
- Convert Imperial and Metric Measurements
- Estimate Numbers of Guests and Supplies

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.



## Task 1:

# Convert Currency

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

- 1.1 One dollar US is worth \$1.33 CDN. How much in Canadian funds do you give a customer in exchange for \$100.00 US?
- 1.2 One dollar US is worth \$ 1.28 Canadian. How much in Canadian funds do you give a customer in exchange for \$50.00 US?

## Task 2:

# Calculate Bills, Including Tips and Taxes

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)
- Percentage
- Decimals

Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

### ► Level 1

- 2.1 A customer orders lunch for \$10.95 and drinks for \$6.50. What is his total bill before taxes?
- 2.2 Calculate GST and PST for the food and beverage order for question 2.1.
- 2.3 What is the total cost of the lunch and drinks, including all taxes, for question 2.1?
- 2.4 A customer has a total bill of \$25.50. He asks you to calculate a 10% tip and include it with the cost of his food order.
  - a) What will his total order cost, including tip?
  - b) How much change will a customer receive from \$30.00?



Please note: Questions referring to tax rates throughout this workbook assume a 6.0% GST and 7.0% PST tax roll.





## ► Level 2

- 2.5 a) A guest in the lounge has ordered drinks for a total cost of \$35.75, not including GST and PST. She presents a coupon for 10% off her bill for this visit. Calculate her total bill.
- b) Marie takes the above order and serves this guest. She receives \$50.00 in cash and the 10% discount coupon as payment. How much change does she owe the customer?
- 2.6 Elaine serves two guests drinks and dinner. They present a voucher for one meal at regular price and the second (less expensive) meal at half price. The prices of the two meals are \$15.95 and \$18.75. The total cost of the drinks is \$20.50. These prices do not include PST or GST. Calculate the total cost of the bill. How much change should the two guests receive from \$100.00 cash?
- 2.7 a) A group of eight guests order dinner and drinks. The total bill is \$545.00, not including PST or GST. Each couple would like to pay their average cost of the bill. What is the average cost that each couple will have to pay?
- b) The above group has asked you, their server, to include a 15% tip in the bill total (including taxes). What is the amount of tip that you can include with this bill?

## Task 3:

## Calculate Food Supply Needs

Performing this task involves the following types of math:

- Integers (Algebra)
- Fractions

## ► Level 1

- 3.1 The lunch-time buffet usually serves 125–150 guests. There are eight slices in a medium-sized pizza. If each customer eats an average of three slices, how many pizzas do you need to make to serve the lunch guests?
- 3.2 You have to make 60 Chicken Kiev entrées. If there are 45 pieces in a box, how many boxes do you need?
- 3.3 The normal serving of steamed vegetables is  $\frac{1}{2}$  cup per guest. Two servings of vegetables per guest is the normal amount prepared. There are three choices of steamed vegetables every day at the lunch buffet.

If 150 guests are expected, how much of each vegetable dish should be prepared?

- 3.4 Rice triples in volume when it is cooked. A chef needs to prepare approximately 80 cups of fried rice for a Chinese food buffet. How much uncooked rice should he use?

## Task 4: Calculate Food and Beverage Costs and Profits

Performing this task involves the following types of math:

- Ratio (Algebra)
- Equations (Algebra)
- Decimals
- Fractions
- Rates
- Percentages
- Metric and Imperial System

### ► Level 1

- 4.1 If rice costs roughly \$0.075 per serving, what is the cost of 80 servings?
- 4.2 a) A chef spent \$347.00 on the ingredients to prepare a buffet for 75 people. If the restaurant charges \$8.95 per person for the buffet, how much will the restaurant make, assuming all the food is sold? (Disregard costs of preparation and service.)  
b) If preparation and service costs are \$1.22 per guest, how much profit will the restaurant make after paying for food cost, preparation, and service?
- 4.3 a) A 4 kg box of chicken breasts costs \$25.95. How much will it cost for 48 kg?  
b) If each chicken breast weighs 90g, how many pieces will there be in a box?  
c) How much does each piece cost?
- 4.4 When mixing drinks, the usual ratio of spirits to mix is 1:5. Calculate the following:  
a) How many ounces are there in total in a single-serving drink?  
b) How many ounces of spirits do you need to mix five drinks?

- c) If a 26-ounce bottle of spirits costs \$30.00, what is the cost per ounce?
- d) If you charge \$3.50 for one ounce of the same spirits, how much do you make for each ounce served?

## ► Level 2

- 4.5 If a 26-ounce bottle of spirits costs \$22.00, and each one-ounce shot sells for \$2.95, how much does the restaurant make for each 26-ounce bottle?
- 4.6 Use the following information to solve a – e below:  
When mixing drinks, the usual ratio of spirits to mix is 1:5 (or one part spirits to five parts mix).
- a) How many ounces of mix will be needed to make 15 drinks?
  - b) At a unit cost of \$0.0135 per ounce, how much will the mix cost for the same 15 drinks?
  - c) At a unit cost of \$0.95 per ounce of spirits, how much will the spirits cost for the same drinks?
  - d) How much will it cost in total to make those 15 drinks?
  - e) If the drinks are sold for \$2.75 each, what profit will be made on those 15 drinks?
- 4.7
- a) The food cost for a buffet is \$2.10 per guest for 100 guests. The price of the buffet is \$6.75 per guest. What is the profit, if the cost of preparation and service is \$60.00 per hour for 3½ hours?
  - b) What is the cost of service and preparation per guest for the buffet?
  - c) What is the profit if 15% of the food is wasted? (Assume that wasted food was not paid for.)
- 4.8 If 1 kg = 2.2 lb., what is the cost per lb. of a 50 kg bag of sugar that costs \$38.50?
- 4.9
- a) If one pound of standing rib roast yields three servings, how many servings will come from a 10 kg-roast?
  - b) The cost of standing rib roast is \$17.405 per kg.  
What is the cost per pound?  
What is the cost per serving?

## ► Level 3

- 4.10 Juana is responsible for finding the best buy on dining room supplies. She has to buy 124 new high-end place settings for the dining room. She has researched prices. Which of the following options would be

the best value for her purchasing dollar?

- a) Place settings: regular price \$75.00 each. Customer receives a 10% discount on orders of eight dozen settings or more.
- b) Place settings: regular price \$78.00 each. Customer receives a discount of 12.5% on orders of \$1,000.00 or more.
- c) Place settings: regular price is \$66.00. Discount of 5% is available if total bill is paid within 30 days.

4.11 Marilyn is in charge of purchasing for the kitchen. She estimates that she will need 150 lb. of prime rib, and is looking for the best price for an upcoming dining room special. She has found the following prices:

- a) Prime rib @ \$8.50 per lb. on minimum orders of 50 lb.
- b) Prime rib @ \$10.25 per lb. with a discount of 10% available on orders of 100 lb. or more.
- c) Prime rib @ \$9.995 per lb. with a 5% discount for the first 75 lb. and another 5% discount for each additional 75 lb. ordered, plus a 5% discount available for orders paid within 30 days.

4.12 If the food cost in the restaurant is 32%, what is the cost of a menu item that is sold for \$15.75?

4.13 At 30% food cost, how much can the chef spend on an item that will be sold for \$12.50?

4.14 Potatoes AP (as purchased) cost \$0.50/kg. There is usually a fairly large trim loss for potatoes of about 20%.

- a) What is the EP (edible portion) cost of the potatoes needed to serve 150 guests, if the portion per guest is 4 oz.?
- b) What is the EP cost per serving?

4.15 What would you gain from buying more expensive potatoes that require less trim?

- a) How much would you save, for example, by buying newer potatoes for \$0.56/kg that lose only 5% when trimmed?
- b) What would be the EP cost per serving?

4.16 a) Calculate the food cost of the following recipe.

**Lasagna:**

|                                    |                  |
|------------------------------------|------------------|
| 4 kg pasta                         | \$3.20 per kg    |
| 5 litre cottage cheese             | \$1.90 per litre |
| 1.8 kg Parmesan                    | \$14.50 per kg   |
| 4 kg Mozzarella                    | \$8.50 per kg    |
| 4 kg ground beef                   | \$3.00 per kg    |
| 4 litres canned or stewed tomatoes | \$2.45 per litre |

|                       |                  |
|-----------------------|------------------|
| 1 litre tomato paste  | \$2.90 per litre |
| 1½ dozen eggs         | \$1.20 per dozen |
| 3 oz. salt            | \$1.00 per kg    |
| 4 oz. sugar           | \$1.75 per kg    |
| 6 oz. chopped parsley | \$8.50 per kg    |
| 4 oz. minced garlic   | \$7.00 per kg    |

- b) If the above recipe yields 70 servings, what is the food cost per serving? Keeping the food cost to 30%, what should this item be priced at per serving?

4.17 Use the following information to solve problems a – e below.

A chef wants to prepare minestrone. The ingredients for the recipe are listed below.

**Minestrone:**

- 1/3 cup lentils
- 2½ tablespoons olive oil
- ¼ lb. Italian sausage
- ¼ cup chopped spinach
- ¼ cup diced carrots
- ¼ cup diced celery
- 1 8-oz. can tomatoes
- ½ cup sliced zucchini
- 1 tsp. salt
- ½ tsp. garlic powder or 1 clove garlic minced

- a) The chef needs to triple the above recipe. What are the new amounts he will need?
- b) Convert the measurements in the recipe for minestrone to metric units. (Note that 1 oz. = 2 tbsp. = 30 ml. Refer to section on measurement in Background/Foundation Skills for more information on metric-Imperial conversions.)
- c) One 8-oz. can of tomatoes costs \$0.79. Fresh tomatoes cost \$0.56/lb. Assuming that 1 5/8 lb. of fresh tomatoes yields the same amount as one 8-ounce can, which option is more cost-effective?
- d) The cost of making one recipe is \$3.90. If the doubled recipe serves 20 people, what will the restaurant's profit be if each serving is sold for \$2.25? (Assume there is no waste.)
- e) If 20% of the soup is wasted, what will the profit be?

4.18 Use the following information to solve problems a – j.

The food cost is the amount that Triple Z Corporation pays for it. The goal for food cost is 30%. In other words, the executives in the food services department work to keep the food cost down to 30% of the price that the restaurant will charge guests for the menu items that are offered.

Note that the food service executives must take into account the waste that is trimmed from food such as vegetables and fruit. All the serving portions advertised in the menu are “before cooked” portion size.

- a) If the food cost in the restaurant is 40%, how much of every dollar that a customer spends goes to pay for food?
- b) If a menu item sells for \$10.00, what is the food cost at 32%?
- c) Keeping food cost to 30%, how much can the chef spend on food for a menu item that is priced at \$6.00?
- d) Chicken fingers sell for \$4.34 in the café. What is our cost if the food cost is 66%?
- e) If you are selling a soup and sandwich special for \$6.95 and the food cost for the soup is \$0.75, how much can you spend on the sandwich at 30%?
- f) Carrots AP (as purchased) cost \$1.60/kg. Assuming 15% trim loss, what is the EP (edible portion) cost? What is the EP weight of 20 kg AP?
- g) T-bone steak costs \$15.00/kg. What is the food cost for an 8-oz. T-bone steak?
- h) Halibut fillets cost \$10.50/lb. There is 5% loss for trim and negligible shrinkage during cooking. Whole salmon costs \$4.50/lb. There is a 35% loss for trim and approximately 5% shrinkage during cooking. Assuming that you would charge the same amount for equal sized portions of each on the menu, which is the better buy for the kitchen?
- i) Prime rib costs \$18.50/kg. How much does an 8-oz. portion cost?
- j) What should the restaurant sell an 8-oz. portion of prime rib for at 33% food cost?

## Task 5:

# Convert Imperial and Metric Measurement

Performing this task involves the following types of math:

- Metric and Imperial System
- Equations (Algebra)
- Ratio (Algebra)

### ► Level 1

5.1 One kg is equal to 2.2 lb. Make the following conversions:

- 6 kg = how many lb.?
- 10.5 kg = how many lb.?
- 6½ lb. = how many kg?
- ¾ lb. = how many kg?
- 10 lb. = how many kg?

### ► Level 2

5.2 One ounce is approximately equal to 29 grams. What is the metric weight of a 4-ounce chicken breast?

5.3 One kilogram is equal to 2.2 lb. How many pounds are there in a 4.5 kg box of pickerel fillets?

5.4 If pickerel sells for \$9.00/lb, what is the cost of 2.5 kg of pickerel?

## Task 6:

# Estimate Number of Guests and Supplies

Performing this task involves the following types of math:

- Estimation Strategies
- Equations (Algebra)

### ► Level 1

6.1 Plates in the buffet service are stacked in four piles, all about the same height. You count 15 plates in the first pile. Estimate the total number of plates. How many plates should you get if you need 75?

- 6.2 a) One dining room sits 80 people and you estimate that it is about one-third full. How many more people can you seat?
- b) The same dining room has three sittings for dinner: at 6:00 p.m., 8:00 p.m. and 10:00 p.m. What is the maximum number of guests that you can serve in an evening?
- c) If the average amount that each guest pays is \$23.00, what is the total amount that the dining room can expect to make in one evening, assuming that it is fully booked?

6.3 The bills for one group of guests are listed below.

|          |         |
|----------|---------|
| Guest #1 | \$36.55 |
| Guest #2 | \$32.95 |
| Guest #3 | \$23.25 |
| Guest #4 | \$27.50 |

Estimate the total of the four bills. (Hint: Round off each receipt to an even multiple of \$10.00, and then calculate an estimated total.)



**C**ompare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

## Task 1: Convert Currency

### Level 1

1.1 \$133.00

1.2 \$64.00

## Task 2: Calculate Bills, Including Tips and Taxes

### Level 1

2.1 \$17.45

2.2 Taxes are GST= \$1.05, PST= \$1.22

2.3 \$19.72

2.4

a) \$28.05

b) \$1.95

### Level 2

2.5

a) \$36.36

b) \$13.64

2.6 Total bill= \$53.37 \$46.63 change

2.7

- a) Taxes are PST = \$38.15 and GST = \$ 32.70  
Total bill = \$615.85.  
Each couple will have to pay \$153.96
- b)  $\$615.85 \times 0.15 = \$92.38$  tip after taxes.

## Task 3: Calculate Food Supply Needs

### Level 1

- 3.1 Based on maximum expected guests:  $150 \times 3 \div 8 = 56.25$  or 57 pizzas. You could also answer this in terms of a range: for 125 guests, 47 pizzas would be needed; and for 150 guests, 57 pizzas would be needed. The range is 47–57 pizzas.
- 3.2  $60 \div 45 = 1 \frac{1}{3}$  boxes
- 3.3 At two servings of vegetables per guest, you will need 300 servings. You will need 100 servings of each type of vegetable or 50 cups of each type of vegetable.
- 3.4  $80 \div 3 = 26 \frac{2}{3}$  or (rounded up) 27 cups uncooked

## Task 4: Calculate Food and Beverage Costs and Profits

### Level 1

- 4.1  $\$0.075 \times 80$  servings = \$6.00
- 4.2
- a)  $(\$8.95 \times 75) - \$347.00 = \$671.25 - \$347.00 = \$324.25$
- b)  $\$324.25 - (\$1.22 \times 75) = \$324.25 - \$91.50 = \$232.75$
- 4.3
- a)  $\$25.95 \times 12 = \$311.40$
- b)  $4 \text{ kg} = 4,000 \text{ g} \div 90 = 44\text{--}45$  pieces per box
- c)  $\$25.95 \div 44.4 = \$0.58$  per piece

4.4

- a) 6 oz.
- b) 5 oz. of spirits
- c) 1.15 per ounce
- d)  $\$3.50 - \$1.15 = \$2.35/\text{ounce of spirits (not including cost of mix)}$

## Level 2

4.5  $(\$2.95 \times 26) - \$22.00 = \$54.70$  per bottle

4.6

- a) 15 drinks at 5 oz. per drink = 75 oz. mix
- b)  $75 \times \$1.35$  cents per oz. = \$1.01 for mix
- c)  $\$0.95 \times 15$  oz. of spirits = \$14.25
- d)  $\$14.25 + 1.01 = \$15.26$  to make 15 drinks
- e) Cost to make one drink =  $(15 \times \$2.75) - \$15.26 = \$25.99$  profit

4.7

- a) \$210.00 food cost  
 $\$675.00$  menu price  $3\frac{1}{2} \times 60 = \$210.00$   
 $\$675.00 - (\$210.00 + \$210.00) = \$675.00 - \$420.00 = \$255.00$  profit
- b)  $\$210.00 \div 100$  guests = \$2.10 per guest prep costs
- c)  $\$675.00 \times 0.15 = \$101.25$  reduction in profit for waste  
 $\$255.00 - \$101.25 = \$153.75$  profit.

(Note that this only applies to food not paid for. If the order is prepaid for all the guests, then wasted food will not result in any loss.)

4.8  $50 \times 2.2 = 110$  lb.  $\$38.50 \div 110 = \$0.35$  per lb.

4.9

- a) 10 kg = 22 lb.  $22 \times 3 = 66$  servings
- b)  $\$17.405$  per kg  $\div 2.2 = \$7.91$  per lb.  $\div 3$  servings per lb. = \$2.64 = food cost per serving

## Level 3

4.10

- a) \$8,370.00
- b) \$8,463.00
- c) \$7,774.80 or \$8,184.00 if not paid within 30 days

Therefore, c is the cheapest option.

4.11

- a) \$1,275.00
- b) \$1,383.75
- c) 5% on first 75 lb. and 10% on additional 75 lb. total = \$1,317.46  
Therefore, a is the best price.

4.12 At 32% food cost, the cost of a menu item that sells for \$15.75 is \$5.04.

4.13  $\$12.50 \times 0.30 = \$3.75$ .

4.14

- a) 4 oz. = 0.25 lb.  
 $0.25 \text{ lb.} \times 150 \text{ guests} = 37.5 \text{ lb. potatoes (EP)} = 80\% \text{ AP} = 46.9 \text{ lb.}$   
 $= 21.3 \text{ kg}$   
 $21.3 \text{ kg} \times \$0.50 = \$10.65 \text{ (EP cost)}$
- b)  $\$10.65 \div 150 \text{ guests} = \$0.071 \text{ EP cost per guest}$

4.15

- a) 37.5 lb. potatoes (EP) = 95% AP = 39.5 lb. = 17.9 kg  
 $17.9 \text{ kg} \times \$0.56 = \$10.02$ , a savings of \$0.63 over the option shown in 4.14 a
- b)  $\$10.02 \div 150 \text{ guests} = \$0.067 \text{ EP cost per guest}$ , a savings of \$0.004 over the option shown in 4.14 b

4.16

- a) Pasta  $\$3.20 \times 4 = \$12.80$
- Cottage cheese  $\$1.90 \times 5 = \$9.50$
- Parmesan  $\$14.50 \times 1.8 = \$26.10$
- Mozzarella  $\$8.50 \times 4 = \$34.00$
- Ground beef  $\$3.00 \times 4 = \$12.00$
- Stewed tomatoes  $\$2.45 \times 4 = \$9.80$
- Tomato paste  $\$2.90 \times 1 = \$2.90$
- Eggs  $\$1.20 \times 1.5 = \$1.80$
- Salt  $\$0.45/\text{lb} \div 16 = 0.03 \times 3 \text{ oz.} = \$0.09$
- Sugar  $\$0.80/\text{lb} \div 16 = 0.05 \times 4 = \$0.20$
- Parsley  $\$3.86/\text{lb} \div 16 = 0.24 \times 6 = \$1.44$
- Garlic  $\$3.18/\text{lb} \div 16 = 0.20 \times 4 = \$0.80$
- Total food cost =  $\$111.43$

b)  $\$111.43 \div 70 = \$1.59$ .

At 30% food cost, this item should sell for \$5.30.

## 4.17

- a) This answer is combined with the answer to question b (below).
- b)
- |           |   |                      |
|-----------|---|----------------------|
| Lentils   | 1 cup =                                     | 240 ml               |
| Olive oil | 7½ tbsp. =                                  | 3¾ oz. or 112.5 ml   |
| Sausage   | ¾ lb. =                                     | 0.3409 kg or 340.9 g |
| Spinach   | ¾ cup =                                     | 180 ml               |
| Carrots   | ¾ cup =                                     | 180 ml               |
| Celery    | ¾ cup =                                     | 180 ml               |
| Tomatoes  | 24 oz. =                                    | 0.72 litres          |
| Zucchini  | 1½ cups =                                   | 360 ml               |
| Salt      | 3 tsp. = 1 tbsp. or                         | 15 ml                |
| Garlic    | 3 cloves minced or 1½ tsp. garlic powder or | 7.5 ml               |
- c)  $1 \frac{5}{8} \times 0.56 = 0.91$  for the equivalent amount of fresh tomatoes.  
Canned tomatoes are cheaper.
- d) A double recipe costs \$7.80.  
 $(20 \times \$2.25) - \$7.80 = \text{profit}$   
 $\$45.00 - \$7.80 = \$37.20 \text{ profit}$
- e) 4 servings are wasted.  
Cost to serve 16 people = \$7.80  
Amount charged =  $16 \times \$2.25 = \$36.00$   
 $\$36.00 - \$7.80 = \$28.20 \text{ profit}$

## 4.18

- a) \$0.40
- b) \$3.20
- c) \$1.80
- d) \$2.86
- e) Total food cost for both items = \$2.09  
 $\$2.09 - \$0.75 = \$1.34 \text{ for sandwich}$
- f)  $\$1.60 \div 0.85 = \$1.88 \text{ per kg for EP}$   
 $20 \times 0.85 = 17 \text{ kg EP}$
- g) 1 serving = 8 oz. 1 kg = 2.2 lb. = 35.2 oz.  $\div 8 \text{ oz.} = 4.4 \text{ steaks per kilo.}$   
At \$15/kg, the food cost of an 8-oz. serving is \$3.41.
- h) Halibut:  $\$10.50 \div 0.95 = \$11.05 \text{ per lb. after trim}$   
Salmon:  $\$4.50 \div 0.65 = \$6.92 \div 0.95 = \$7.28 \text{ per lb.}$   
Salmon is the better buy.
- i) Cost is \$8.41 per lb.  
\$4.21 for an 8-oz. portion
- j)  $\$4.21 \div 0.33 = \$12.76 \text{ per portion to keep food cost at 33\%}$

# Task 5: Convert Imperial and Metric Measurement

## Level 1

5.1

- a)  $6 \text{ kg} = 13.2 \text{ lb.}$
- b)  $10.5 \text{ kg} = 23.1 \text{ lb.}$
- c)  $6\frac{1}{2} \text{ lb.} = 2.95 \text{ kg}$
- d)  $\frac{3}{4} \text{ lb.} = 0.34 \text{ kg}$
- e)  $10 \text{ lb.} = 4.55 \text{ kg.}$

## Level 2

5.2  $29 \times 4 = 116$  grams

5.3  $4.5 \times 2.2 = 9.9$  lb. per box

5.4  $\$9.00 \times 2.2 = \$19.80$  per kg  $\times 2.5 \text{ kg} = \$49.50$

# Task 6: Estimate Number of Guests and Supplies

## Level 1

6.1 About 60 plates. You will need to get another 15.

6.2

- a)  $\frac{2}{3}$  of 80 can still be seated.  $\frac{2}{3} \times 80 = 53 \frac{1}{3}$  or (rounded down) 53 people
- b)  $80 \times 3$  sittings = 240 guests for the evening
- c)  $\$23.00 \times 240.00 = \$5,520.00$

6.3 Rounded off totals for the bills are:

Guest #1 = \$40.00

Guest #2 = \$30.00

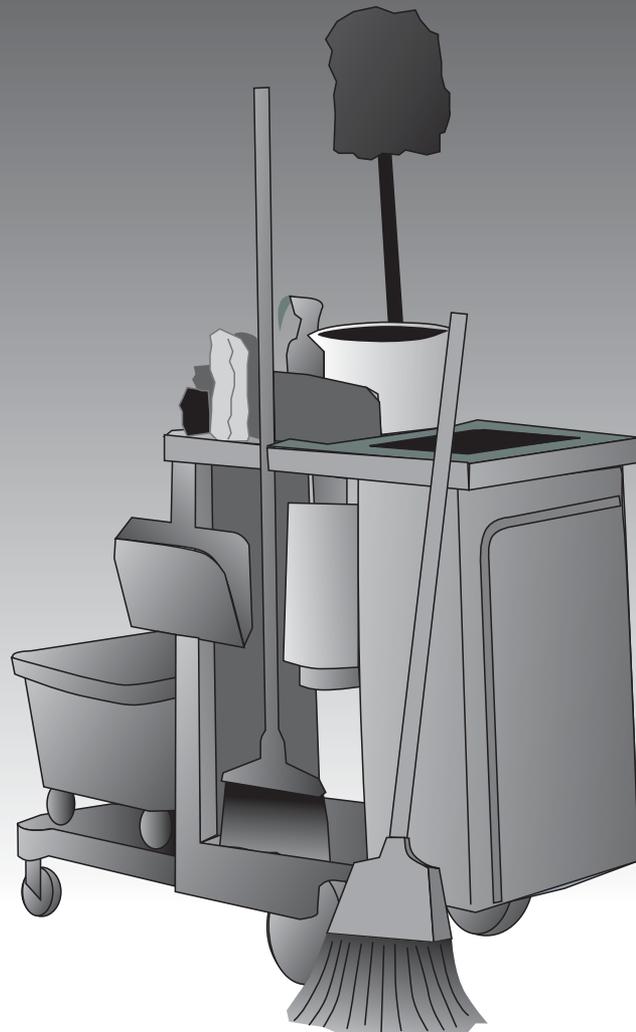
Guest #3 = \$20.00

Guest #4 = \$30.00

Total of rounded off amounts = \$120.00

## Job Family Section

# Housekeeping and Grounds



# Introduction

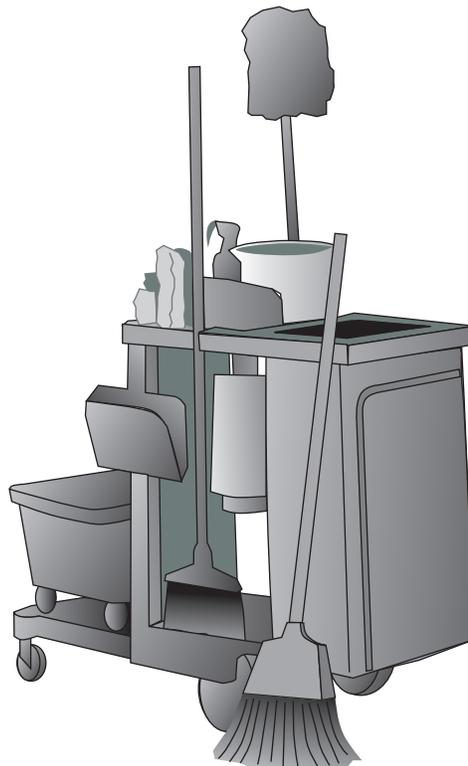
People who work in housekeeping and grounds use math for many different purposes. The math skills needed for these jobs range from the basic (needed to calculate hours required to complete a task) to the complex (needed to calculate perimeter, area, volume, or proportions). Analytical math skills may also be needed to do more complex tasks such as estimating how much it will cost to pave a certain area.

In this section, you will practise how to:

- Calculate Staff and Supply Needs
- Calculate Hours and Pay
- Calculate and Compare Costs

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.



## Task 1:

# Calculate Staff and Supply Needs



Performing this task involves the following types of math:

- Algebra
- Decimals
- Rates
- Geometry
- Military Time
- Percentages

Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

### ► Level 1

- 1.1 It takes eight hours for one staff member to clean the large meeting room after a two-day event. If it has to be cleaned in two hours, how many workers are needed to complete the job?
- 1.2 Use the information below to answer questions a - b.

The cleaning staff use (on average) 40 mL of cleaning solution for each public washroom. There are 6 public washrooms and each one is cleaned daily.

- How many litres of cleaning solution will be needed for one week?
- When counting supplies, the supervisor sees that there is only one bottle of cleaning solution left (1 gallon US/3.86 litres). Will this be enough to last until the next order of inventory arrives 6 days from now, or should she buy a supply with her standing purchase order (PO)?

### ► Level 2

- 1.3 Use the following information to answer questions a – h.

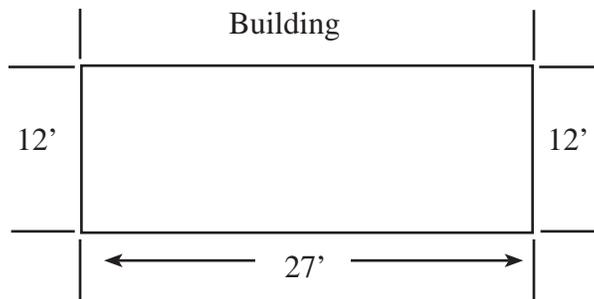
Jason is a grounds worker. During the summer, he cuts and maintains the lawns, weeds flowerbeds, trims hedges and keeps the area free of trash. During the winter, he is responsible for keeping all the walkways clear of snow and ice. His regular work schedule is Wednesday to Saturday, 0900 to 1900 hrs. His wages are \$9.50 per hour for a 36-hour week.

- Fuel for the lawn tractor has to be mixed. The ratio of gas to oil is 32:1. How much oil should he add to 4 litres of gas?
- He is responsible for managing his work time so that the lawn cutting is done in the evenings, after 4:00 p.m. The average time it takes him to mow all the lawn area is 8 hours. How many days will it take him to mow all the lawns?

- c) Every 2 weeks he needs to trim the hedges. It takes him approximately 2½ hours to do this using a power hedge trimmer, and about 4 hours to do it with manual trimmers. The fuel needed to do the job costs just over \$3.00. Which is the more cost-effective way to trim the hedges?
- d) What percentage of his work time will he save by using the power hedge trimmers?
- e) The fuel for the power hedge trimmers is mixed in a ratio of 29:1 (gas to oil). It holds 3 litres of fuel. How much of this is gas? How much is oil?
- f) There is approximately 2.7 km of walkway on the grounds. The walkways measure 1 metre wide, and all are paved. He has found that the best way to keep them clear of ice is to spread a mixture that resembles fine gravel every 2 or 3 days in the winter. He uses approximately 10 lb of this mixture for each km of sidewalk. Calculate how much he will need (in kg) to do the all of the walkways. (Hint: convert measurements before performing calculations.)
- g) Using an average of 6 applications per month over a 6-month period, what will be the cost of the mixture for one season? The price is \$0.90 per kg.
- h) What is Jason's regular annual pay?

1.4 Use the following information to answer questions a – i.

Andrea has been asked to plan a flower garden for a certain area in front of one of the buildings. The area measures 12 feet wide by 27 feet long, and is rectangular in shape. On one long side it borders one of the buildings.



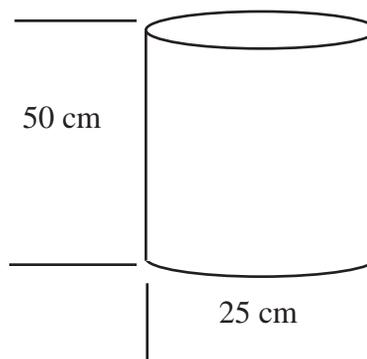
- a) What is the area in square yards? (1 yard = 3 feet; 1 square yard = 9 square feet)
- b) She wants to plant 3 rows of colourful perennial shrubs along the full length of the garden plot closest against the building, and fill the remaining area with flowering annuals. The instructions for planting state that there should be 18" between each shrub, and 18" between the shrub and the outside border of the garden. How many shrubs should she order?

- c) According to the instructions for planting the annuals, she should plant them 6" apart, and 6" from the outside border of the garden. Note that the rows of annuals will start 6" away from the perennials. How many annuals should she order?
- d) One bag of topsoil will cover 2 square yards of ground area to a depth of approximately 6". How many bags of topsoil should she order for this particular garden?
- e) How many feet of in-ground border should she order if she wants to border the garden on three sides?
- f) At a greenhouse, each perennial shrub costs \$12.95, and a tray of 6 annuals costs \$4.75. How much will it cost to buy the perennials? How much will it cost to buy the annuals?
- g) A bag of topsoil costs \$1.79. (Remember that each bag covers 2 square yards of ground area.) What will be the cost of the topsoil needed for this garden?
- h) Underground garden border costs \$10.99 for an 8' length. What will be the cost of the underground border for this garden?
- i) Calculate the total cost of all the above items (before taxes). Assuming all items are subject to PST and GST, what will be the total PST and GST on all the plants and garden accessories? Calculate the total cost of the order.



### ► Level 3

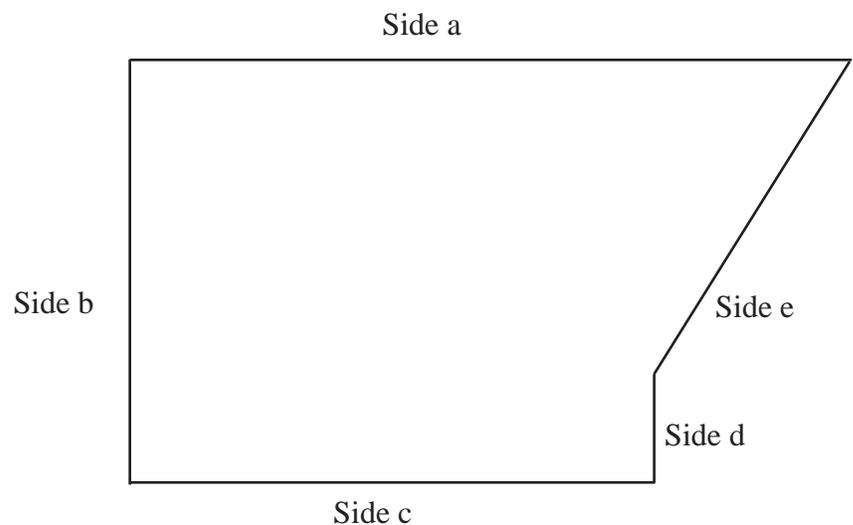
- 1.5 The mixture used to wash windows is a chemical concentrate mixed with water in a ratio of 1 part concentrate to 9 parts water. Calculate the volume of the container shown below. How much window washing solution should be added to the can to make one litre of mixture?



1.6 The windows are to be washed once per week. Twenty-five litres are needed each week to do all the windows. How many containers of solution will be needed to wash windows for a 3-month period?

1.7 Use the following information to answer questions a – d.

June has to plant grass in a particular area of the grounds. The area will need to be seeded to grass, fertilized and covered with a layer of topsoil. The diagram below represents the area to be planted. (The sides are labelled and dimensions are shown below the diagram. Note that you should convert all measurements to the appropriate unit before beginning calculations. In this case, the questions ask about metric units, so convert everything to metric measure.)



Side a = 125 ft

Side b = 72 ft

Side c = 80 ft

Side d = 12 ft

Side e = 75 ft

- Calculate the area of the space to be seeded. (show your answer in meters)
- If one bag of seed covers  $60 \text{ m}^2$ , how many bags will be needed to seed this spot?
- One bag of fertilizer will cover  $150 \text{ m}^2$  of seeded soil. How much fertilizer will be needed for the spot?
- How much topsoil will be needed to cover the seed to a depth of 150 mm?

## Task 2:

# Calculate Hours and Pay

Performing this task involves the following types of math:

- Military time
- Decimals
- Rates
- Percentage

### ► Level 1

2.1. Use the information below to answer questions a – e.

Murray's work schedule for the pay period February 1–8, 2005 is shown below.

| Date      | Time In    | Time Out   | Total Hours |
|-----------|------------|------------|-------------|
| Feb. 1/05 | 6:30 a.m.  | 11:30 a.m. |             |
|           | 12:15 p.m. | 3:01 p.m.  |             |
| Feb. 2/05 | 8:28 a.m.  | 12:30 p.m. |             |
| Feb. 5/05 | 6:20 a.m.  | 11:25 a.m. |             |
|           | 12:15 p.m. | 3:05 p.m.  |             |
| Feb. 6/05 | 6:28 a.m.  | 11:33 a.m. |             |
|           | 12:16 p.m. | 3:03 p.m.  |             |
| Feb. 7/05 | 8:21 a.m.  | 12:25 p.m. |             |
| Feb. 8/05 | 8:28 a.m.  | 12:45 p.m. |             |

- Calculate the hours worked each day by this employee. Express parts of hours as decimal numbers. (round hours down to the closest quarter hour)
- Calculate the total hours worked for this pay period. Express parts of hours in decimal format.
- Murray is a part-time grounds employee. His wage is \$11.50 per hour. What is his gross pay for this pay period?
- Show his hours in military time. (That is, using the 24-hour clock system.)
- If Murray is called out to work on a holiday, he is paid time and one half, and receives pay for a minimum of 3 hours' work. How much will he be paid if he works for 2 hours on a holiday?

2.2 Use the information below to answer questions a – d.

Rosa's work schedule is shown below. Her hourly rate of pay is \$8.35. Any hours that she works beyond 35 hours per week are paid at time and a half.

Timesheet for Rosa  
Pay period Jan. 2 – Jan. 8, 2005

| <b>Day/Date</b>  | <b>Time In</b> | <b>Time Out</b> | <b>Total Time</b> |
|------------------|----------------|-----------------|-------------------|
| Sun. Jan. 2/05   |                |                 |                   |
| Mon. Jan. 3/05   | 5:57 a.m.      | 10:45 a.m.      |                   |
| Tues. Jan. 4/05  | 5:50 a.m.      | 11:10 a.m.      |                   |
| Wed. Jan. 5/05   | 5:50 a.m.      | 11:30 a.m.      |                   |
| Thurs. Jan. 6/05 |                |                 |                   |
| Fri. Jan. 7/05   | 6:00 a.m.      | 11:10 a.m.      |                   |
| Sat. Jan. 8/05   | 5:55 a.m.      | 11:35 a.m.      |                   |

- Calculate the time worked for each day (hours and minutes).
- Calculate the total hours for the week.
- Convert this total to a decimal number (hours and tenths of hours).
- Calculate her gross earnings for this pay period.

2.3 Use the information below to answer questions a – c.

Housekeeping staff may take pay for holiday time if they wish. They are paid 2½% of earnings for holiday time.

- Mildred is a full-time housekeeper. Her normal shift is 35 hours per week, at \$9.60 per hour. How much holiday pay should she receive on each cheque for a 2-week time period?
- Joel is a full-time grounds worker. His regular shift is 40 hours per week for 48 weeks per year. What percentage of his total employment is given as holiday time?
- If Joel's hourly wage is \$9.45, what is his gross pay for one year?

## Task 3:

# Calculate and Compare Costs

Performing this task involves the following types of math

- Percentage
- Rate



Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

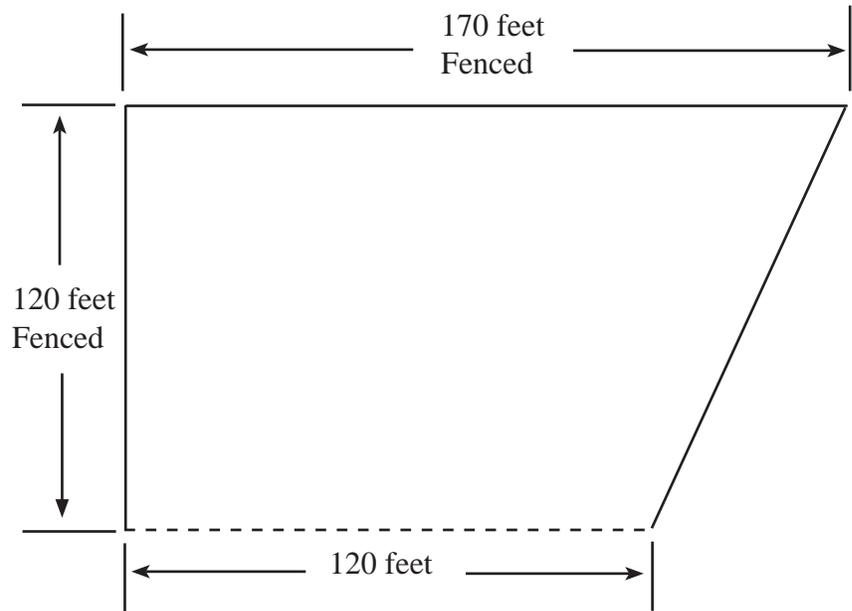
### ► Level 1

- 3.1 The cost of hiring a contractor to clean the carpets in the casino is \$73.00. The cost of equipment and supplies needed for on-site staff to do the same job is \$25.45. It takes one housekeeper 4 hours to clean the same carpet. His hourly wage is \$9.85. Which is the more cost-effective way to clean the casino carpet?
- 3.2 Use the information below to answer questions a – c.  
Window cleaner concentrate costs \$3.89 per litre. One litre is mixed with 6 litres of water to make window cleaner.
- What is the cost per mixed litre of window cleaner?
  - Which is the better buy: window cleaner concentrate (at the price mentioned), or pre-mixed cleaner at \$0.73 per litre?
  - Add taxes (7% for PST and 6% for GST) to the prices for window cleaner, both concentrate and pre-mixed. Does that change your answer?

### ► Level 3

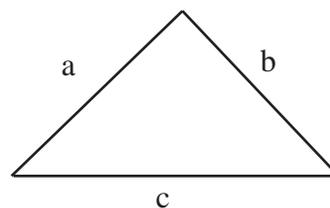
- 3.3 Use the information below to answer questions a – g.

The parking area diagrammed below has to be paved and fenced. It will be paved with cement that is 200 mm deep. The fence will surround 3 sides as shown with the solid line. The cost of pavement (supplies, equipment, labour) is \$8.00 per cubic foot. Fencing costs \$7.75 per linear foot. All expenses are subject to PST and GST. In addition, an advance payment of 30% of the total cost is required before work can begin.



- Calculate the area of the space shown.
- Calculate the volume of mixed concrete that will be needed to pave the space to a depth of 20 cm. (Hint: convert all measurements to the same unit before doing calculations.)
- What will be the cost of paving the area?
- What length of fence will be required for the locations indicated?

You need to use the Pythagorean Theorem to find the length of the side that forms a corner angle less than  $90^\circ$ . Assume the other fenced corner is  $90^\circ$ . Here is the Theorem: If a triangle has sides of length (a,b,c), with sides (a,b) enclosing an angle of 90 degrees (a “right angle”), then  $a^2 + b^2 = c^2$ .



- What will be the cost of fencing for the area?
- How much money will be required as a deposit for the job?
- To make certain that the square corner is indeed  $90^\circ$ , Harry measures along each side of the fence from the corner. On one side he makes a mark at exactly 3 feet, and on the other side he makes a mark at exactly 4 feet. He then stretches a string between the two marks and finds that it is exactly 5'. Is the corner  $90^\circ$ ?



**C**ompare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

## Task 1: Calculate Staff and Supply Needs

### Level 1

1.1 4 people

1.2

- a)  $7 \times 6 \times 40 = 1,680$  ml or 1.680 litres used per week
- b) If 1.680 L is needed per week, 3.86 is more than enough to last until supplies are ordered.

### Level 2

1.3

- a) 1/8 litre
- b) At 3 hours a day, he will need 3 days to complete the job.
- c) Power is more cost effective:  $(2\frac{1}{2} \times \$9.50) + \$3.00 = \$26.75$  vs.  $4 \times \$9.50 = \$38.00$
- d)  $1.5/4 = 37.5\%$
- e) 1/10 L oil and  $2\frac{9}{10}$  L gas.
- f)  $10 \text{ lb} \div 2.2 = 4.5 \text{ kg/km}$  of sidewalk.  $4.5 \times 2.7 = 12.3 \text{ kg}$  needed to de-ice all walkways.
- g)  $\$0.90 \times 6 \times 6 \times 12.3 = \$398.52$  plus PST and GST ( $\$27.90 \times 2$ ) =  $\$454.32$
- h) Jason's annual pay =  $\$9.50 \times 36 \times 52 = \$17,784.00$

1.4

- a) 36 sq. yards
- b) 3 rows  $\times$  17 plants per row = 51 perennials
- c) 53 plants per row  $\times$  13 rows = 689 annuals
- d) 18 bags for 6" cover over garden area.

- e) 51' of in-ground border are needed
- f) \$660.45 for 51 perennials and \$546.25 for 690 annuals (there will be one extra)
- g) \$32.22 for topsoil
- h) 7 lengths needed  $\times$  \$10.99 = \$76.93
- i) \$1,315.85 + 6% GST and 7% PST (\$78.95 + \$92.11) = \$1,486.91

## Level 3

1.5 Volume = area of base  $\times$  height

$$V = \pi \times r^2 \times \text{height}$$

$$V = 3.14 \times (12.5 \times 12.5) \times 50$$

$$V = 24,531.25 \text{ cc or } 24.53 \text{ L}$$

24.53 Litres  $\div$  10 = 2.453 Litres of window washing concentrate to be added

1.6 3 months = 13 weeks. 25 L  $\times$  13 weeks = 325 L needed for 3 months

1.7

- a) Step one is to convert all measurements to metres. The most accurate way to do this is to multiply the number of feet by 12 to get inches. Then multiply the total inches by 2.54 to get cm. Then divide the number of cm by 100 to get meters.

$$\text{Side a} = 125 \times 12 = 1,500 \text{ inches} \times 2.54 = 3,810 \text{ cm} = 38.10 \text{ m}$$

$$\text{Side b} = 72 \times 12 = 864 \text{ inches} \times 2.54 = 2,194.56 \text{ cm} = 21.95 \text{ m}$$

$$\text{Side c} = 80 \times 12 = 960 \text{ inches} \times 2.54 = 2,438 \text{ cm} = 24.38 \text{ m}$$

$$\text{Side d} = 12 \times 12 = 144 \text{ inches} \times 2.54 = 365.76 \text{ cm} = 3.66 \text{ m}$$

$$\text{Side e} = 75 \times 12 = 900 \text{ inches} \times 2.54 = 2,286 \text{ cm} = 22.86 \text{ m}$$

Area can be found by creating several smaller plane figures:

Side c  $\times$  Side b = 24.38 m  $\times$  21.95 m = 535.14 m<sup>2</sup> plus area of triangle:

$$\frac{1}{2}(13.72 \times 18.29) = 125.47 \text{ m}^2$$

Therefore the area of the entire figure = 535.14 m<sup>2</sup> + 125.47 m<sup>2</sup>.

$$\text{Total area} = 660.61 \text{ m}^2$$

- b) 660.61  $\div$  60 = 11.1 or just over 11 bags
- c) 660.61  $\div$  150 = 4.40 or 5 bags
- d) Total area  $\times$  depth = volume.  $V = 660.61 \text{ m}^2 \times 0.150 \text{ m} = 99.09 \text{ m}^3$

# Task 2: Calculate Hours and Pay

## Level 1

### 2.1

a)

Feb. 1: 7.75 hours.

Feb. 2: 3.75 hours.

Feb. 5: 7.75 hours.

Feb. 6: 7.75 hours.

Feb. 7: 4 hours.

Feb. 8: 4.25 hours

b) 35.25 hours

c)  $35.25 \times 11.50 = \$405.38$

d)

Feb. 1: 0630–1130 and 1215–1501 hours

Feb. 2: 0828–1230 hours

Feb. 5: 0620–1125 and 1215–1505 hours

Feb. 6: 0628–1133 and 1216–1503 hours

Feb. 7: 0821–1225 hours

Feb. 8: 0828–1245 hours

e)  $11.50 \text{ per hour} \times 1.5 \text{ time} \times 3 \text{ hours minimum} = \$51.75$

### 2.2 Rosa's hours

a)

Jan. 3: 4 hours 48 minutes

Jan. 4: 5 hours 20 minutes

Jan. 5: 5 hours 40 minutes

Jan. 7: 5 hours 10 minutes

Jan. 8: 5 hours 40 minutes

b) Total hours: 26 hours and 38 minutes

c) 26.63 hours

d)  $26.63 \times \$8.35 = \$222.36$

### 2.3

a) At 2½% holiday pay:  $35 \times \$9.60 = \$336.00$

Per week gross  $\times 0.025 = \$8.40$  per week or \$16.80 for each paycheque

b)  $1/13 = 0.0769$  (rounded off to 3 places), or 7.7%

c) Gross pay for one year =  $\$9.45 \times 40 \times 48 \text{ weeks} = \$18,144.00$

# Task 3: Calculate and Compare Costs

## Level 1

3.1 \$73.00 for a contractor vs.  $\$39.40 + \$25.45 = \$64.85$  to do the job in-house.

It is cheaper to have the in-house staff do the job.

3.2

- a) When mixed, 7 litres of solution is created.  $\$3.89 \div 7 = \$0.56$ .
- b) Concentrate is cheaper.
- c) Adding taxes doesn't change the value for the purchasing dollar.

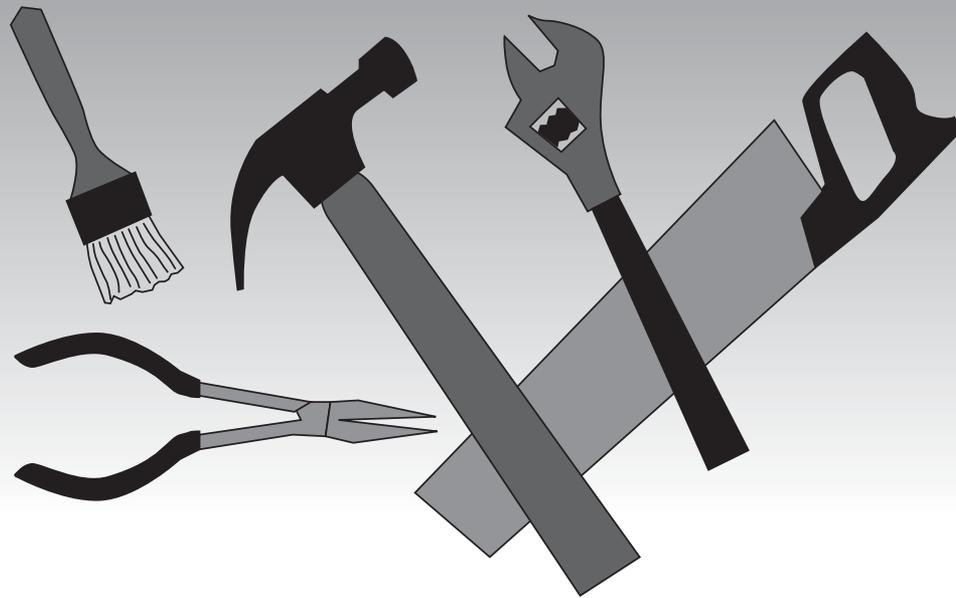
## Level 3

3.3

- a)  $120 \times 120 + \frac{1}{2}(50 \times 120) = 14,400 + 3,000 = 17,400$  square feet.
- b) 20 cm ~ (is approximately equal to)  $\frac{2}{3}$  foot.  $V = 17,400 \times \frac{2}{3} = 11,600$  cubic feet.
- c)  $11,600 \times \$8.00 = \$92,800.00 + 6\% \text{ GST and } 7\% \text{ PST } (\$5,568.00 + \$6,496.00) = \$104,864.00$
- d)  $120 + 170 + 130 = 420$  feet. Use the Pythagorean Theorem to calculate the angled side.
- e)  $\$7.75 \times 420 \text{ feet} = \$3,255.00 + \text{GST and PST } (\$227.85 + \$227.85) = \$3,710.70$
- f) Total for all work =  $\$109,502.70$ . Deposit of 30% =  $\$32,850.81$
- g) Yes, because  $3^2 + 4^2 = 5^2$

## Job Family Section

# Maintenance and Facilities



# Introduction

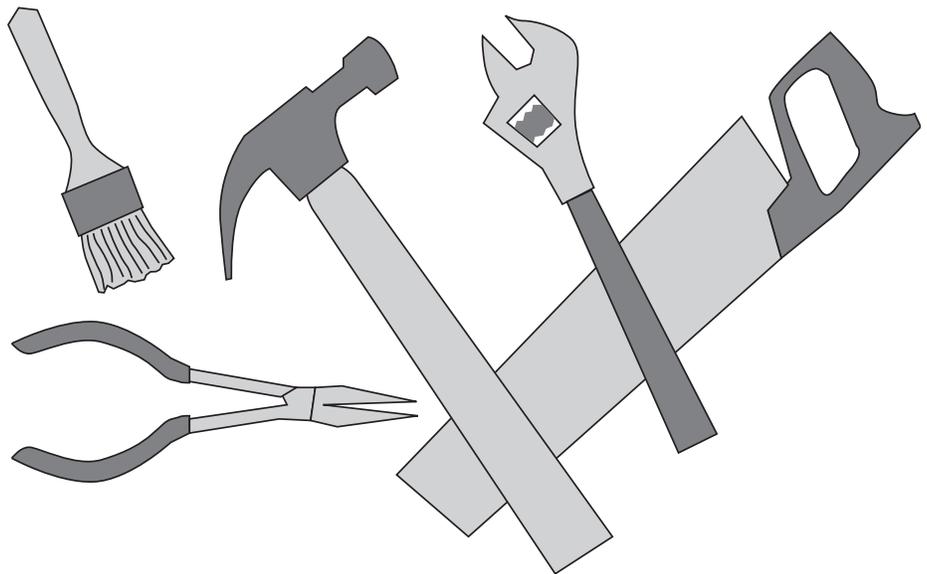
People who work to build, repair, operate, maintain and renovate properties use math for many different purposes. The math skills needed for these jobs range from the basic (to read meters) to the complex (to calculate perimeter, area, volume, or proportions). Analytical math skills may be needed to do more complex tasks, such as studying trends, making projections or creating a budget.

In this section, you will practise how to:

- Calculate and Monitor Power Consumption
- Determine the Best Buy
- Calculate Purchase Orders
- Make Projections
- Calculate Hours of Work
- Calculate Cost and Amount of Materials/Equipment

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for this task.



## Task 1:

# Calculate and Monitor Power Consumption

Performing this task involves the following types of math:

- Rates
- Decimals
- Percentages
- Integers (Algebra)

### ► Level 1

1.1 Hydro consumption for three months at Triple Z Casino is shown below:

Month #1 1,157,018.15 kWh.

Month #2 1,089,373.35 kWh.

Month #3 1,211,544.34 kWh.

- Calculate the average consumption for the three months.
- What is the difference in consumption between the month of highest consumption and lowest consumption?

1.2 Gas consumption for three months at Triple Z Casino is shown below:

Month #1 86,683.19 m<sup>3</sup>

Month #2 52,869.78 m<sup>3</sup>

Month #3 37,109.47 m<sup>3</sup>

- Calculate the total consumption for the three-month period.
- What is the average consumption for this three-month period?

1.3 The proper term for wattage is “power”. The proper term for amperes is “current”. Power available = Voltage × Current.

- If the service provided is 240 volts and current is 60, how much power is available for use?
- With the power available, could you run an electrical range that uses 16000 watts?

1.4 The cost of water is \$0.350 per 100 cubic feet. How much water can you use for \$200.00?

1.5 The cost of water is \$0.350 per 100 cubic feet. How much will 5000 cubic feet cost?

1.6 Use the information in the chart below to answer questions a - c.

Water consumption, in hundreds of cubic feet, for the past four months for four water meters is listed below.

| Month    | Unit #1 | Unit #2 | Unit #3 | Unit #4 |
|----------|---------|---------|---------|---------|
| January  | 544     | 831     | 945     | 890     |
| February | 587     | 998     | 1,043   | 979     |
| March    | 776     | 801     | 985     | 970     |
| April    | 795     | 884     | 909     | 1,002   |

- a) Calculate the total consumption for the 4 units for the 4 months.
- b) Calculate the average consumption per unit per month.
- c) Estimate which meter records the highest consumption of water.

1.7 Use the following information to answer questions a – e.

The cost of hydro per kilowatt-hour in both casinos is \$0.03668 per kWh. Municipal tax of 2½%, provincial tax of 7% and GST of 6% are all charged on hydro. First, municipal tax is calculated and included, then PST and GST are charged on the total that includes municipal tax.

- a) For 1 month, the hydro consumption at Triple Z Casino was 1,731,600.00 kWh. What was the cost of electricity for that month (before taxes)?
- b) The hydro consumption at the Double X Casino was 2,001,000.00 for the same month. Calculate the cost of electricity for that month (before taxes).
- c) Calculate the taxes that will be charged on the Triple Z Casino hydro bill. What is the total cost for hydro for the month?
- d) Calculate the taxes that will be charged on the Double X Casino hydro bill. What is the total cost for hydro for the month?
- e) What is consumption used for a bill that shows charges of \$16,709.94 (before taxes)?

1.8

- a) You are responsible for making sure that the air temperature in the casino is 20 degrees Celsius  $\pm$  1.75 degrees. What are the upper and lower temperature limits in the casino?
- b) You note that one reading is 18.2 degrees C. Is this within acceptable limits?

### ► Level 3

1.9 Use the information below to solve problems a and b.

A fuel-efficient furnace burns more of the fuel supplied to it than a furnace of lower efficiency does. For example, a furnace that is rated at 75% efficiency burns about 75% of the fuel that is given to it. The rest of the fuel that is supplied to the furnace is wasted. A furnace that burns at an efficiency of 95% burns 95% of the fuel that is available to it. Therefore, you can save money on fuel with a high-efficiency furnace because you don't pay for fuel that does not produce heat.

- a) The purchasing department has been trying to decide whether to replace an old furnace. It runs well, but operates at only 77% efficiency. In 2004, the fuel for this unit cost \$938.00. How much of this cost went to pay for waste?
- b) If the purchasing department buys a new furnace that is rated as 95% efficient, how much will it cost to heat the same area to the same temperature? (Assume the cost of fuel remains the same.)

1.10 Use the following information to answer questions a – f.

A 100-watt incandescent bulb burns for 1,000 hours and costs \$0.72. A 100-watt fluorescent tube burns for 500 hours and costs \$3.55. Incandescent bulbs are 80% efficient and fluorescent tubes are 95% efficient. The cost of hydro is \$0.033 per kilowatt hour.

- a) If a 100-watt incandescent bulb burns for 1,000 hours, how many kilowatt hours does it use? At \$0.033 per kWh, what is the cost of burning one incandescent bulb (for 1,000 hours)?
- b) If there are 50 incandescent bulbs in the office building, how many kilowatt- hours do they use in total? What is the cost of burning 50 bulbs (for 1000 hours)?
- c) The cost of hydro is \$0.033 per kWh. At 80% efficiency, what is the cost of the wasted energy for 1 bulb? What is the cost for 50 bulbs? (Assume they will burn for 1000 hours.)
- d) Calculate the taxes paid on wasted electricity. (Remember that 2½% municipal tax is charged first, and 7% PST and 6% GST are calculated on the total that includes municipal tax.)
- e) What is the cost of burning a 100-watt fluorescent lamp for 5,000 hours? At 95% efficiency, what will be the cost of power wasted?
- f) Calculate the savings from using 1 fluorescent lamp vs. 5 incandescent lamps over 5,000 hours of use. Include efficiency in your calculations.

- 1.11 The average cost of heating the large dining room is \$400.00 per month. With new insulation, this can be reduced by 20%. The cost of insulating the dining room has been estimated at \$2,500.00.
- How much money will be saved during the first year after the insulation is installed?
  - About how many years will it take for the insulation to pay for itself in savings on heating costs?

1.12 The formula for energy efficiency is 
$$\frac{\text{energy output}}{\text{energy input}} = \text{energy efficiency}$$

There is an old furnace rated at 72% efficiency in the basement of the Human Resources offices. The present cost of energy is \$14,000.00 per year.

- How much money could be saved by replacing this old furnace with an energy-efficient model rated at 95% efficiency (based on a constant price for fuel)?
- What is the energy efficiency of a unit that uses 555,430 units of energy to produce 525,980 units of energy?
- What is the energy efficiency of a unit that uses 2,456,000 units of energy to produce 2,388,000 units of energy?

## Task 2: Determine the Best Buy

Performing this task involves the following types of math:

- Percentages
- Counting Cash

### ► Level 3

- 2.1 Henri is in charge of purchasing dining room furniture and equipment. He needs to buy or re-upholster 200 dining room chairs. He comes up with the following options:
- Buying 200 chairs at \$85.00 per chair. Purchase discount of 12.5% given on all orders of \$16,500.00 or more (before taxes) if total is paid within 30 days.
  - Buying 150 chairs at \$95.00 per chair. Additional chairs will cost \$62.50 per chair.

- c) Buying 200 chairs at \$95.00 each and additional chairs at 10% off the regular price if the total order is greater than \$15,000.00.
- d) Re-upholstering and re-finishing all the chairs he has at a cost of \$75.00 each plus \$27.50 per chair for labour costs.

Calculate the cost of each of the above options (not including taxes). Which is Henri's best buy?

## Task 3:

### Calculate Purchase Orders

Performing this task involves the following types of math:

- Percentages
- Counting Cash

Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

#### ► Level 1

- 3.1 You have a standing purchase order (PO) for \$500.00. If you buy materials costing \$190.50, how much will be left on your PO?
- 3.2 a) Calculate 7% PST and 6% GST on a purchase of \$137.45.  
b) After both taxes are included, what is the total cost of the purchase?
- 3.3 You have a P-card that allows you to make emergency purchases for up to \$75.00. You need to buy a tape measure (\$14.95 plus tax), a 4-litre container of mastic for ceramic tile (\$43.00 plus tax) and 5 ceramic tiles (\$1.38 each) to finish a small but top-priority job. Can you buy these materials with your P-card?

## Task 4:

### Make Projections

Performing this task involves the following types of math:

- Integers (Algebra)
- Rates

#### ► Level 1

- 4.1 If there are 4 tanks, each having a 150-gallon capacity in the basement of the casino, what is the total capacity of the tanks in the casino?

- 4.2 a) It takes 1 worker a full day (8 hours) to complete a task. If this task must be done within 2 hours, how many people should be assigned to complete it?
- b) If 1 chair can be recovered in 1 hour, how many chairs can be recovered on Tuesday morning between 8:00 and noon?
- c) How many chairs can be covered by 3 workers during the same time period?

## Task 5:

### Calculate Hours of Work

Performing this task involves the following types of math:

- Military Time

#### ► Level 1

- 5.1 Chris is a full-time employee. His normal shift is 0700 hours to 1600 hours with  $\frac{1}{2}$  hour unpaid meal-break each shift. Chris told you that he worked until 5:00 p.m. on Monday and Tuesday. How many overtime hours did he work for the 2 days?
- 5.2 Dan's usual shift is midnight to 8:00 a.m. If he works  $1\frac{1}{2}$  hours of overtime on Wednesday, what time do you record as the end of his shift?
- 5.3 Mary's regular shift is 0100 to 0930 five days per week. She has one hour of unpaid time from 0430 - 0530 every shift. How many hours does she work over a 2-week period?

## Task 6:

### Calculate Cost and Amount of Materials/Equipment

Performing this task involves the following types of math:

- Geometry
- Decimals
- Percentages
- Rate



Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.



## ► Level 2

6.1 Use the information below to answer questions a - c.

You have to frame in an office space. The area to be enclosed is  $10' \times 12'$ . You need to build 3 walls to enclose the space. Two of the walls are to be 10' long and the third is to be 12' long. There are no doors or windows in the walls you are framing. The ceiling height is 8'.

- a) Assuming that you use  $4' \times 8'$  sheets, how many sheets of gyproc will you need to enclose the new office area?
- b) At a cost of \$8.39 per sheet, how much will the gyproc cost (including PST and GST) for this project?
- c) Under normal circumstances, a gallon (US) of interior paint covers 400 square feet. How much paint will be required to paint the new office with 2 full coats?

6.2 Use the information below to answer questions a - d.

You want to build a bookshelf for one of the offices. Your plan is to build a unit that is 60" high, 48" wide, and 12" deep, with 6 shelves (including the top and bottom levels). You will be using solid birch for the construction. It is available in 14" wide  $\times$  3/4" thick rough boards. The bottom shelf, top shelf and third shelf from the bottom will each be held in place with 4 wood screws. Four brackets per shelf will be used to support the other 3 shelves.

- a) How many linear feet of birch lumber will you need to build this unit?
- b) At a cost of \$2.22 per linear foot, plus 7% PST and 6% GST, what will be the cost of the lumber for this project?
- c) You plan to sand and apply 3 coats of varathane to both sides of all the lumber before assembling the unit. If one litre of varathane covers 100 square feet, how many litres will you need for the project?
- d) How many brackets will you need to complete the project? How many screws will you need?

## ► Level 3

6.3 The maintenance department needs a new fleet of 6 trucks. The best price they have found is \$30,000.00 per truck. The combined cost of maintenance and insurance is projected to be \$3,700.00 per year per vehicle. Depreciation in the first year of operation is 25%, and for each of the following 4 years, depreciation is 15%. After 5 years, they will be traded in or sold outright for salvage value.

- a) Calculate the salvage value of each truck.
- b) Calculate the cost of operating each of these trucks (not including fuel).

6.4 Use the following information to answer questions a – f.

The maintenance department wants to re-carpet a semi-circular area of the BINGO hall. The distance across the widest part of the area (the diameter of the circle) is 28 feet.

- a) Calculate the area of the space to be covered. (Hint: use  $22/7$  for the value of pi.)
- b) There is usually about 30% waste of materials when covering a semi-circular area. How much carpeting will be needed to complete the job?
- c) What is the cost of the carpeting needed to cover this area if the price is \$9.50 per square foot installed? What is the cost of the waste?
- d) There is substantially less waste when covering a semi-circular area with stone tile. If the waste is 11%, and the stone tile costs \$11.25 per square foot installed, how much stone must be purchased to do the job?
- e) Refer to the square footage calculated in d. How much will the stone cost? What will be the cost of the waste?
- f) Assuming that both floor coverings are suitable for the purpose, which is the better buy?

Compare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

## Task 1:

# Calculate and Monitor Power Consumption

### ► Level 1

1.1

- a) Total =  $3,457,935.84 \div 3 = 1,152,645.28$  (average)
- b) Difference = 122,170.99

1.2

- a) Total = 176,662.44
- b) Average = 58,887.48

1.3

- a) 14,400 watts
- b) No

1.4  $571.43 \times 100$  cubic feet = 57,143 cubic feet.

1.5  $(5,000 \div 100) = 50 \times \$0.35 = \$17.50$

1.6

- a) Total = 13,939
- b) Average consumption = 871.1875
- c) Unit 3. This can be verified by calculation. However, by rounding off values, the highest consumption shown is unit 3.

1.7

- a) Cost of hydro before taxes (Triple Z Casino):  $1,731,600 \times \$0.03668 = \$63,515.09$
- b) Cost of hydro before taxes (Double X Casino):  $2,001,000 \times \$0.03668 = \$73,396.68$

- c) Triple Z Casino: Municipal taxes = \$1,587.88 (subtotal = \$65,102.97). PST (7%) = \$4,557.21, GST (6%) = \$3,906.18 Total = \$73,566.36
- d) Double X Casino: Municipal taxes = \$1,834.92 (subtotal = \$75,231.61). PST (7%) = \$5,266.21 , GST (6%) = \$ 4,513.90. Total cost = \$85,011.72
- e) Rounded off to whole number = 455,560 kWh

1.8

- a) Temperature limits are 18.25 degrees C (lower) and 21.75 degrees C (upper).
- b) 18.2 degrees C is not within the limits.

### ► Level 3

1.9

- a)  $100 - 77 = 23\%$ .  $0.23 \times \$938.00 = \$215.74$
- b) Cost @ 100% =  $\$938.00 \times .77 = \$722.27 \div 0.95 = \$760.27$

1.10

- a) 100 kWh used. At \$0.033 per kWh, to burn one bulb for 100 kWh = \$3.30
- b) To burn 50 bulbs = 5,000 kWh @ 0.033 = \$165.00
- c) Cost of energy wasted =  $3.30 \times 0.20 = \$0.66$  per bulb burning for 1,000 hours  $\times 50$  bulbs = \$33.00 waste out of \$165.00 total paid
- d)  $\$33.00 \times 0.025 = \$0.83$ . Subtotal = \$33.83 plus 7% PST and 6% GST (\$2.37 + \$2.03) = \$38.23
- e)  $100 \text{ watts} \times 5,000 \text{ hours} = 500,000 \text{ watt-hours}$  or 500 kWh used  $\times 0.033 = \$16.50 =$  cost of electricity to burn one lamp for 5000 hours  $\times 0.05 = \$0.825$  cost of wasted energy
- f) To burn 1 fluorescent lamp (5000 hours of light) costs \$16.50  
 To purchase 1 fluorescent lamp costs \$ 3.55  
 Total cost to buy and burn \$20.05  
 Total cost  $\times 0.95$  efficiency \$19.05
  
- To burn 5 incandescent lamps  
 (1,000 hrs  $\times 5 = 5,000$  hours of light) \$16.50  
 To purchase 5 incandescent lamps (5 @ \$0.72 each) \$ 3.60  
 Total cost to buy and burn \$20.20  
 Total cost  $\times 0.80$  efficiency \$16.08

Fluorescent lamps are a better buy because they waste less energy. The cost of wasted energy in a large property is significant.

1.11

- a)  $\$400.00 \times 12 \times 0.2 = \$960.00$
- b)  $2,500 \div 960 = 2.6$  or 3 years

1.12

- a) \$3,389.47 annually
- b) 0.947 or 94.7%
- c) 0.972 or 97.2%

## Task 2:

### Determine the Best Buy

#### ► Level 3

2.1

- a) \$14,875.00
- b) \$17,375.00
- c) \$19,000.00
- d) \$20,500.00

Henri's best buy is option A.

**Note that from the information given in the question, option d is much more expensive.** (Calculations aren't really necessary to eliminate d.)

## Task 3:

### Calculate Purchase Orders

#### ► Level 1

3.1  $500 - 190.50 = \$309.50$

3.2

- a) \$9.62 PST and \$8.25 GST
- b) Total cost including taxes = \$155.32

3.3  $\$14.95 + \$43.00 + (5 \times \$1.38) + \$4.54 \text{ (tax)} + \$3.90 \text{ (tax)} = \$73.28$   
Yes, you can make the purchase.

## Task 4:

### Make Projections

#### ► Level 1

4.1  $4 \times 150 = 600$  gallons

4.2

- a) 4 people will be needed to finish the task.
- b) 4 chairs can be recovered in 4 hours.
- c)  $4 \text{ chairs} \times 3 \text{ workers} = 12 \text{ chairs in 3 hours}$

## Task 5:

### Calculate Hours of Work

#### ► Level 1

5.1  $(16 - 12 = 4)$   $5:00 - 4:00 = 1$  hour per day.  $2 \text{ days} = 2$  hours O/T

5.2  $8:00 \text{ a.m. plus } 1\frac{1}{2} \text{ hours O/T} = \text{finishing time of } 9:30 \text{ a.m.}$

5.3  $7\frac{1}{2} \times 10 \text{ days} = 75 \text{ hours}$

## Task 6:

### Calculate Cost and Amount of Materials/Equipment

#### ► Level 2

6.1

- a)  $32' \times 8' \rightarrow 8$  sheets of  $4' \times 8'$  mounted vertically
- b)  $8 \times \$8.39 = \$67.12$  plus 7% PST and 6% GST = \$75.85 total cost
- c)  $256 \text{ sq. ft.} \times 2 = 512 \div 400 = 1.28$  gals will be needed

6.2

- a)  $6 \times 48'' + 60'' \times 2 = 408'' \div 12$  (inches per foot) = 34'.  
However, there will be some waste for all the cuts made, so it would be advised to buy extra (35').

- b)  $35' \times \$2.22$  per foot = \$77.70 plus 7% PST = \$5.44 and 6% GST = \$4.66  
 Total cost = \$87.80
- c) Six shelves = 48 sq. ft. (counting both sides)  
 Two sides = 20 sq. ft. (counting both sides)  
 Total : 68 sq. ft.  
 $68 \text{ sq. ft.} \times 3 \text{ coats} = 204 \text{ sq. ft.}$   
 3 L of varathane will cover 300 sq. ft.  
 3 litres are needed.
- d)  $3 \times 4$  screws = 12 screws.  
 $3 \times 4$  brackets = 12 brackets

### ► Level 3

6.3

- a) Salvage value = \$11,745.14  
 b) Operation = \$18,500.00.

6.4

- a)  $A = 22/7 \times 14 \times 14 = 616 \text{ sq. ft.} \div 2$  (for a semi-circle) = 308 sq. ft.  
 b)  $308 \div 0.7 = 440 \text{ sq. ft.}$   
 c)  $440 \times \$9.50 = \$4,180.00$ .  $308 \times \$9.50 = \$2,926.00$   
 Difference of \$1,254.00 = cost of waste  
 d)  $308 \div 0.89 = 346 \text{ sq. ft.}$   
 e) Cost at 346 sq. ft. = \$3,892.50. Difference of \$427.50 = cost of waste.  
 f) Tile is cheaper. (Waste must be included in cost.)

# Job Family Section

## Retail



# Introduction

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People working retail in the gaming industry use many kinds of math skills. They calculate tax, count cash and give change. In transactions with customers, they often have to convert currency. They calculate discounts as well as markups on retail items. They also take inventory of stock, and check invoices and packing slips to ensure that the information is accurate.

In this section, you will practise how to:

- Calculate GST and PST
- Calculate Discount and Markup
- Count Cash
- Convert Currency
- Take Inventory and Record Amount Sold

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble performing any of these activities, review the Foundations Math Skills that are used for each task.



# Task 1:

# Calculate GST and PST



Performing this task involves the following types of math:

- Percentages
- Decimals

Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

## ► Level 1

1.1 Calculate the GST and PST on each of the following totals and complete the table below.

| Price before taxes + | GST<br>× \$0.06 + | PST<br>× \$0.07 = | Total price after taxes |
|----------------------|-------------------|-------------------|-------------------------|
| \$65.80              |                   |                   |                         |
| \$120.60             |                   |                   |                         |
| \$35.00              |                   |                   |                         |
| \$78.90              |                   |                   |                         |
| \$123.76             |                   |                   |                         |
| \$90.50              |                   |                   |                         |
| \$150.95             |                   |                   |                         |
| \$220.15             |                   |                   |                         |
| \$58.46              |                   |                   |                         |
| \$94.35              |                   |                   |                         |

1.2 Complete the following table, using the second method of calculating more than one percentage. Compare the totals. The second method is: multiply the total percentage amount by the starting price.

| Price before taxes | GST and PST<br>Price × \$1.13 = Total |
|--------------------|---------------------------------------|
| \$65.80            |                                       |
| \$120.60           |                                       |
| \$35.00            |                                       |
| \$78.90            |                                       |
| \$123.76           |                                       |
| \$90.50            |                                       |
| \$150.95           |                                       |
| \$220.15           |                                       |
| \$58.46            |                                       |
| \$94.35            |                                       |



- 1.3 a) A guest comes into the retail outlet and purchases three items for \$19.95, \$4.59 and \$22.00. What is the total cost of the purchase before taxes?
- b) Calculate the GST and PST on the above purchase. What is the total that the guest owes?
- c) The guest pays with three twenty-dollar bills. What change should the guest receive?

1.4 A guest comes into the retail outlet and makes the following purchases:

- (i) Item for \$12.50
- (ii) Item for \$7.99
- (iii) Item for \$3.25
- (iv) Item for \$6.29

- a) Calculate the total amount of this purchase before taxes.
- b) Items (i) and (ii) are subject to PST and GST. Items (iii) and (iv) are subject to PST only. Calculate the total taxes for this purchase.
- c) This person pays with a \$50.00 bill. How much change do you give him?



## Task 2:

# Calculate Discount, Markup and Percentage

Performing this task involves the following types of math:

- Percentages
- Integers (Algebra)
- Decimals
- Cash on Hand (Counting Cash)

Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

### ► Level 1

- 2.1 The store has ordered souvenir baseball caps for the upcoming summer season. The wholesale price is \$7.50 per cap. After a markup of 35%, what will the retail price be?



## ► Level 2

- 2.2 The store has ordered souvenir baseball caps for the upcoming summer season. The wholesale cost of these caps is \$7.50 each, including gold embroidery on the beaks. If you sell them for \$12.99, what percentage is the markup?
- 2.3 The clerk in the retail outlet is responsible for accepting shipments of goods ordered for the store. The merchandise shown on the packing slip below is being delivered to the store.

|                 |  |        |                |
|-----------------|--|--------|----------------|
| 12 ea           | men's t-shirts/long-sleeved (size Med)         | \$8.99 | \$107.88       |
| 12 ea           | men's t-shirts/long-sleeved (size Lge)         | \$8.99 | \$107.88       |
| 12 ea           | ladies' t-shirts/long-sleeved (size Med)       | \$8.49 | \$101.88       |
| 24 ea           | ladies' t-shirts/long-sleeved (size Lge)       | \$8.49 | \$101.88       |
| 10 ea           | children's t-shirts/long-sleeved (size 6X)     | \$5.59 | \$167.76       |
| 10 ea           | children's t-shirts/short-sleeved (size 8-10)  | \$5.59 | \$55.90        |
| 10 ea           | children's t-shirts/short-sleeved (size 12-14) | \$5.89 | <u>\$58.90</u> |
| <b>Subtotal</b> |  |        | \$702.08       |

- a) Are all the price extensions correct?
- b) Only 12 ladies' Large long-sleeved t-shirts were actually delivered. How does this affect the cost of the merchandise on the order?
- c) What is the total adjusted cost of this order? (Disregard taxes.)
- d) You wish to sell the above merchandise at a markup of 18%. What will the retail prices be for each of these items?
- e) How much PST will you charge for a man's t-shirt?
- f) What will be the total taxes (PST and GST) charged for a ladies' medium-size t-shirt?
- g) A customer buys one ladies' large-size long-sleeved t-shirt and two children's short-sleeved t-shirts in 1 in sizes 8-10 and 1 in 12-14. There is no PST on children's clothing. What is the total cost of her purchase? What change should you give her if she pays with a \$50.00 bill?



## Task 3:

# Count Cash

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

3.1 a) You are counting cash at the end of your shift. The breakdown of cash in your till is listed below. Calculate the total cash you have on hand.

27 \$20 bills

53 \$10 bills

31 \$5 bills

48 toonies

19 loonies

66 quarters

49 dimes

25 nickels

25 pennies

b) If you began your shift with a \$75.00 cash float, how much cash did you take in during your shift?

3.2 You began your shift with 35 one-dollar tickets on display. You sold 17 of them, and then added 10 more to the display. How many tickets do you now have on display? (Hint: to make this type of calculation, combine all gains and then combine all losses, and find the difference between the two. A net gain means your combined gains are greater than your combined losses. A net loss means that your combined losses are greater than your combined gains.)

3.3 There were 25 three-dollar tickets in the cupboard and 7 three-dollar tickets in the display when you began your shift. There are now 15 three-dollar tickets in the cupboard, and 8 in the display. How many three-dollar tickets did you sell during your shift? (Hint: read the notes in question 3.2 about net gains and net losses.)

3.4 During your shift, you sold tickets as shown in the list below. Calculate the total value of the tickets that you sold.

$$4 \times \$1.00 = \underline{\hspace{2cm}}$$

$$5 \times \$2.00 = \underline{\hspace{2cm}}$$

$$12 \times \$3.00 = \underline{\hspace{2cm}}$$

$$2 \times \$5.00 = \underline{\hspace{2cm}}$$

## ► Level 2

- 3.5 Use the cash recap below to answer the following question. You began your shift with \$85.00 cash float in bills and coins in the till. At the end of your shift you must balance the cash. Use the formula shown below. Does your cash till balance?

Cash on hand = Sales + opening cash float

| Total sales | Total cash on hand |          |
|-------------|--------------------|----------|
| \$12.95     | (\$0.01)           | \$0.53   |
| \$15.89     | (\$0.05)           | \$0.80   |
| \$25.35     | (\$0.10)           | \$1.40   |
| \$49.00     | (\$0.25)           | \$19.50  |
| \$8.55      | (\$1.00)           | \$20.00  |
| \$33.59     | (\$2.00)           | \$18.00  |
| \$28.33     | (\$5.00)           | \$35.00  |
| \$45.50     | (\$10.00)          | \$90.00  |
| \$1.07      | (\$20.00)          | \$120.00 |

## Task 4:

## Convert Currency

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

## ► Level 2

- 4.1 The current rate of exchange for US dollars is 125%. In other words, one dollar US will be exchanged for \$1.25 CDN. A customer wants to exchange \$75.00 US for Canadian funds. If this customer doesn't make a purchase, how much Canadian money will he receive for \$75.00 US?
- 4.2 If a customer comes into the outlet with \$70.00 US, and the exchange rate is 125%, how much Canadian cash do you give her in exchange for the US funds?

## Task 5:

# Take Inventory and Record Amount Sold

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)
- Integers (Algebra)

### ► Level 1

5.1 You have the stock of cigarettes that is listed below.

|            |           |
|------------|-----------|
| Cameo      | 4 cartons |
| Rothmans   | 5 cartons |
| Players    | 8 cartons |
| Matinee    | 3 cartons |
| du Maurier | 7 cartons |
| Viscount   | 2 cartons |

- a) How many cartons are on hand in total?
- b) Each carton contains eight packages. How many packages of cigarettes do you have on hand?

5.2 During your shift you made the following ticket transactions with \$5.00 tickets:

Began shift with ten \$5.00 tickets in the display and twenty-five in the cupboard.

Sold 4 tickets

Sold 2 tickets

Received a packet of 25 tickets from supervisor

Sold 6 tickets

Sold 10 tickets

Moved 10 tickets from cupboard to display.

- a) Write a math statement that describes the number of tickets on display.
- b) Write a math statement that describes the total number of tickets on hand. How many \$5.00 tickets do you now have on hand?

### ► Level 3

5.3 Complete the chart below.

### Physical Count Sheet

|   | Open | Add/Sub | Close | Sold |           | Total |
|---|------|---------|-------|------|-----------|-------|
| Cupboard                                  | 38   | 100     | 90    |      |           |       |
| Insert                                    | 12   |         | 22    |      | × \$1.00  | =     |
| Total                                     |      |         |       |      |           |       |
| Cupboard                                  | 115  |         | 73    |      |           |       |
| Insert                                    | 66   |         | 52    |      |           |       |
| Total                                     |      |         |       |      | × \$2.00  | =     |
| Cupboard                                  | 245  |         | 210   |      |           |       |
| Insert                                    | 57   |         | 44    |      |           |       |
| Total                                     |      |         |       |      | × \$3.00  | =     |
| Cupboard                                  | 82   |         | 55    |      |           |       |
| Insert                                    | 17   |         | 11    |      |           |       |
| Total                                     |      |         |       |      | × \$5.00  | =     |
| Cupboard                                  | 31   |         | 21    |      |           |       |
| Insert                                    | 16   |         | 8     |      |           |       |
| Total                                     |      |         |       |      | × \$10.00 | =     |
| Cupboard                                  | 12   |         | 7     |      |           |       |
| Insert                                    | 15   |         | 11    |      |           |       |
| Total                                     |      |         |       |      | × \$20.00 | =     |
| Total Offline Sales (Physical Count) = \$ |      |         |       |      |           |       |
| Offline Sales (POS Report) = \$           |      |         |       |      |           |       |

### Cigarette Count

| Open | Add | Total | Close | Sold |
|------|-----|-------|-------|------|
| 43   | 16  | 59    | 25    |      |

Cartons: 30 × 8 = \_\_\_\_\_ (+) Winstons: 4 (+) Loose Display: \_\_\_\_\_

### Number 7 and Peter Jackson Cig. Count

| Open | Add | Total | Close | Sold |
|------|-----|-------|-------|------|
| 21   | 8   | 29    | 14    |      |

Cartons: 13 × 8 = \_\_\_\_\_

(+) Loose Display: \_\_\_\_\_

Physical Gift Certificate Count

|         | Open | Add | Total | Close | Sold |
|---------|------|-----|-------|-------|------|
| \$5.00  | 20   |     | 20    | 18    |      |
| \$10.00 | 20   |     | 20    | 11    |      |
| \$20.00 | 15   |     | 15    | 11    |      |
| \$50.00 | 12   |     | 12    | 12    |      |

5.4 You receive the goods that are listed on the following invoice. You are responsible for making sure that all of the price extensions are correct. (That is, the number shipped times the unit price equals the total amount.)

**From** Trevor-Hollingshead Co. Ltd. **Invoice #** X38313  
 147 Pioneer Avenue  
 Winnipeg, MB **Date:** 04/20/05

**Sold To** Triple Z Casino  
 123 ABC Street  
 Winnipeg, MB  
 R2X 2H2

| Cust. No. | Customer Order No. | Terms  | Ship Via | Sales Rep |
|-----------|--------------------|--------|----------|-----------|
| M3939     |                    | Net 30 |          |           |

| tem No. | Description         | Qty Ordered/ Shipped | Unit Price | Total   |
|---------|---------------------|----------------------|------------|---------|
| 23025   | Peanuts BBQ 12/100g | 1 1                  | \$7.25     | \$7.25  |
| 20010   | Deluxe Nuts 24/85g  | 4 3                  | \$18.95    | \$75.80 |
| 57036   | Jujubes 12/box      | 2 2                  | \$13.25    | \$26.50 |
| 34808   | Coffee Crisp 24/52g | 1 1                  | \$15.95    | \$15.95 |
| 57767   | Aero Bars 24/54g    | 2 1                  | \$15.95    | \$31.90 |
| CC9909  | Coffee Mugs         | 12 12                | \$1.95     | \$25.95 |
| KK4000  | Key Chains          | 20 18                | \$0.50     | \$10.00 |

- Find the errors in the invoice and make the necessary corrections to ensure that the correct price is paid.
- How much was Triple Z overcharged on this invoice?

- c) Calculate the profit that you will make if you sell all of the coffee mugs at a 25% markup.
- d) You plan to sell the key chains for \$0.89 each. What percent markup is this?
- e) The Aero bars sell for \$1.15 per individual package. What percentage markup is this from the wholesale price?
- f) At \$1.15 per package of Deluxe Nuts, how much will you make on this item over the year if your average sales are \$46.00 per month?

5.5 Review the inventory records below:

**Inventory Record**

**Item: Key Chains**

| Date    | Received | Count | Sold |
|---------|----------|-------|------|
| July 4  | 25       | 45    |      |
| July 7  | 17       |       |      |
| July 14 | 25       | 27    |      |
| July 22 | 40       |       |      |
| July 29 |          | 21    |      |

**Total Sold** = Items received – items on hand

**Inventory Record**

**Item: Coffee Mugs**

| Date    | Received | Count | Sold |
|---------|----------|-------|------|
| July 4  | 12       | 22    |      |
| July 8  | 12       |       |      |
| July 16 | 12       | 17    |      |
| July 23 | 24       |       |      |
| July 29 |          | 11    |      |

**Total Sold** = Items received – items on hand

**Inventory Record**

**Item: Peanuts BBQ 100g**

| Date    | Received | Count | Sold |
|---------|----------|-------|------|
| July 6  | 120      | 135   |      |
| July 15 | 120      |       |      |
| July 24 | 120      | 144   |      |
| July 28 |          | 72    |      |

**Total Sold** = Items received – items on hand

**Inventory Record****Item: Aero Bars 54g**

| Date    | Received | Count | Sold |
|---------|----------|-------|------|
| July 8  | 144      | 178   |      |
| July 15 |          | 51    |      |
| July 20 | 144      |       |      |
| July 29 |          | 27    |      |

**Total Sold** = Opening balance of items in stock + items received – items on hand

- a) How many key chains did you have in stock before these transactions occurred? How many key chains have you sold?
- b) How many coffee mugs did you have in stock before these transactions occurred? How many coffee mugs have you sold?
- c) How many packages of BBQ peanuts did you have in stock before these transactions occurred? How many packages of BBQ peanuts have you sold?
- d) How many Aero bars did you have in stock before these transactions occurred?  
How many Aero bars have you sold?



Compare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

## Task 1: Calculate GST and PST

### ► Level 1

#### 1.1

| Price before taxes + | GST<br>× \$0.06 + | PST<br>× \$0.07 = | Total price after taxes |
|----------------------|-------------------|-------------------|-------------------------|
| \$65.80              | \$3.95            | \$4.61            | \$74.36                 |
| \$120.60             | \$7.24            | \$8.44            | \$136.28                |
| \$35.00              | \$2.10            | \$2.45            | \$39.55                 |
| \$78.90              | \$4.73            | \$5.52            | \$89.15                 |
| \$123.76             | \$7.43            | \$8.66            | \$139.85                |
| \$90.50              | \$5.43            | \$6.34            | \$102.27                |
| \$150.95             | \$9.06            | \$10.57           | \$170.58                |
| \$220.15             | \$13.21           | \$15.41           | \$248.77                |
| \$58.46              | \$3.51            | \$4.10            | \$66.07                 |
| \$94.35              | \$5.67            | \$6.60            | \$106.62                |

#### 1.2

| Price before taxes | GST and PST<br>Price × \$1.13 = Total |
|--------------------|---------------------------------------|
| \$65.80            | \$74.35                               |
| \$120.60           | \$136.28                              |
| \$35.00            | \$39.55                               |
| \$78.90            | \$89.16                               |
| \$123.76           | \$139.85                              |
| \$90.50            | \$102.27                              |
| \$150.95           | \$170.57                              |
| \$220.15           | \$248.77                              |
| \$58.46            | \$66.06                               |
| \$94.35            | \$106.62                              |

1.3

- a) \$46.54
- b)  $\$46.54 + \$6.05 = \$52.59$
- c)  $\$60.00 - \$52.59 = \$7.41$

1.4

- a) Total purchase before taxes = \$30.03
- b) Taxes (6% GST and 7% PST) of item (i) and (ii) = \$2.66  
Tax (7% PST) of item (iii) and (iv) = \$0.67  
Total taxes = \$3.33
- c) Total cost to customer = \$33.36. Change from \$50.00 = \$16.64

## Task 2: Calculate Discount, Markup, and Percentage

### ► Level 1

- 2.1  $\$7.50 + (\$0.35 \times \$7.50) = \$7.50 + \$2.63 = \$10.13$ .  
A simpler method is  $\$1.35 \times \$7.50 = \$10.13$ .

### ► Level 2

2.2 73.2%

2.3

- a) No.  
24 ladies' long-sleeved t-shirts @ \$8.49 should equal \$203.76  
10 children's t-shirts (size 6X) should equal \$55.90  
Subtotal should be \$702.08.
- b) If only 12 ladies' large-size t-shirts were delivered, the correct price should be \$101.88.
- c) The correct subtotal will change to \$590.22.
- d) \$8.99 items will retail for \$10.61.  
\$8.49 items will retail for \$10.02.  
\$5.59 items will retail for \$6.60.  
\$5.89 items will retail for \$6.95.
- e) PST on a man's t-shirt will be \$0.74.
- f) 6% GST and 7% PST on a ladies' t-shirt will be \$1.30.
- g) Total cost for merchandise = \$25.82. Change = \$24.18.

## Task 3: Count Cash

### ► Level 1

3.1

- a)
- |              |                   |
|--------------|-------------------|
| \$20.00 =    | \$540.00          |
| \$10.00 =    | \$530.00          |
| 5.00 =       | \$155.00          |
| toonies =    | \$96.00           |
| loonies =    | \$19.00           |
| quarters =   | \$16.50           |
| dimes =      | \$4.90            |
| nickels =    | \$1.25            |
| pennies =    | \$0.25            |
| <b>Total</b> | <b>\$1,362.90</b> |
- b)  $\$1,362.90 - \$75.00 = \$1,287.90$

3.2  $35 - 17 + 10 = 28$

3.3  $(25 + 7) - (15 + 8) = 42 - 23 = 9$

This is an example of an “integers” problem, in which you add all positive values and add all negative values and then find the difference between the two. If the positive values are greater, then you have gained. If the negative values are greater, you have lost.

3.4  $\$4.00 + \$10.00 + \$36.00 + \$10.00 = \$60.00$  total

### ► Level 2

3.5 Yes, the till balances against sales and float.

## Task 4: Convert Currency

### ► Level 2

4.1  $\$75.00 \text{ US} \times \$1.25 = \$93.75 \text{ CDN}$

4.2  $\$70.00 \text{ US} \times \$1.25 = \$87.50 \text{ CDN}$

# Task 5: Take Inventory and Record Amount Sold

## ► Level 1

5.1

- a) 29 cartons
- b)  $29 \text{ cartons} \times 8 \text{ packages per carton} = 232 \text{ packages}$

5.2

- a) Total on display =  $10 - 4 - 2 + 25 - 6 - 10 + 10$
- b) Total on hand =  $(10 + 25) - 4 - 2 + 25 - 6 - 10$   
Now have 38 \$5.00 tickets on hand.

## ► Level 3

5.3

Total \$1.00 tickets sold = 38 for \$38.00  
Total \$2.00 tickets sold = 56 for \$112.00  
Total \$3.00 tickets sold = 48 for \$144.00  
Total \$5.00 tickets sold = 33 for \$165.00  
Total \$10.00 tickets sold = 18 for \$180.00  
Total \$20.00 tickets sold = 9 for \$180.00  
Total tickets as recapped on sheet = \$819.00  
Physical count will verify this total.

**Cigarette count:** 34 sold + 240 packages in cartons + 4 Winstons,  
+ loose display

**Number 7 and P. Jackson count** 15 sold + 104 packages in cartons +  
loose display

**Physical Gift Certificate Count** = \$5.00 denomination 2 sold  
\$10.00 denomination 9 sold  
\$20.00 denomination 4 sold  
\$50.00 denomination 0 sold

5.4

- a) Deluxe Nuts should be \$56.85.  
Aero Bars should be \$15.95.  
Coffee Mugs should be \$23.40.  
Key Chains should be \$9.00.

- b) Original Total = \$193.35  
 Correct total = \$154.90  
 Overcharged = \$38.45
- c)  $\$23.40 \times 1.25 = \$29.25$  less cost of  $\$23.40 = \$5.85$ . Or,  $\$23.40 \times 0.25 = \$5.85$ .
- d) There are two steps for solving markup and markdown questions. First, calculate the difference between the new price and the original price. Then compare the difference to the original price.  
 Difference between cost and selling price = \$0.39  
 = 78% of \$0.50
- e) See notes for question d and use the same procedure.  
 Difference = \$0.49  
 = 74% of \$0.66
- f) Packages per month:  $\$46 \div \$1.15 = 40$   
 Cost per package =  $\$18.95 \div 24 = \$0.79$   
 Total Cost =  $40 \times \$0.79 = \$31.60$   
 Revenue = \$46.00  
 Profit per month =  $\$46.00 - \$31.60 = \$14.40$   
 Profit per year =  $\$14.40 \times 12 = \$172.80$

## 5.5

- a)  
 Key Chains sold = Opening balance = 20  
 Received 107  
 On-hand = 21  
 106 sold
- b)  
 Coffee Mugs sold = Opening balance = 10  
 Received = 60  
 On-hand = 11  
 59 sold
- c)  
 BBQ Peanuts sold = Opening balance = 15  
 Received = 360  
 On-hand = 72  
 303 sold
- d)  
 Aero Bars sold = Opening balance = 34  
 Received = 288  
 On-hand = 27  
 295 sold

# Job Family Section

# Security



# Introduction

This section deals with the math skills that security workers need. Security work includes tracking numbers of guests, and their arrival and departure times. Security workers must work out people's ages from their identification cards. They also track and count chips and money. In a supervisory position, a security worker keeps track of mileage and gas consumption on security vehicles, and calculates overtime hours and payment. Security investigators examine the final tally deposited by the dealers and look for discrepancies. They also compare and calculate average bets at tables.

In this section, you will practice how to:

- Track Guests
- Check Identification
- Count Money
- Count Chips
- Count Drop
- Calculate Salary and Hours
- Track Bets in Casino Games
- Track Fleet Costs

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.



# Task 1:

## Track Guests

- Performing this task involves the following types of math:
- Integers (Algebra)

### ► Level 1

1.1 Use the information below to answer questions a – c.

At noon, the security department determined that there were 307 guests in the Triple Z Casino. Between noon and 12:30 that day, two guards (at the main entrance) and one guard (at the second entrance) kept count of the guests who were coming into and leaving the building. At the main entrance, Jeff clicked 233 guests arriving, and Dan clicked 109 guests leaving. At the second entrance, Philip clicked 69 guests arriving and 81 guests leaving.

- What was the total number of guests that arrived (at both entrances)?
- What was the total number of guests that left (at both entrances)?
- How many guests are in the building at 12:30?

1.2 Use the following information to answer questions a – f.

During one busy shift, there were 343 people on site at Triple Z Casino at 6:00 p.m. During the 4 hours that followed, there were the following arrivals and departures:

| Time  | Arrivals/Departures                                    |
|-------|--|
| 18:10 | 1 tour bus of 64 people arrived                        |
| 18:25 | 2 tour buses, each having 52 people arrive             |
| 18:55 | 1 group of 33 people left                              |
| 19:15 | 17 people arrived                                      |
| 19:30 | 21 people left   |
| 20:00 | 7 people arrived                                       |
| 20:35 | the people on the first tour bus (64 individuals) left |
| 20:45 | a group of 12 volunteers arrived                       |
| 22:10 | 49 guests left after a show                            |

- a) How many people arrived on tour buses?
- b) How many people arrived in total?
- c) How many people left during the time period between 7:00 p.m. and 10:00 p.m.?
- d) How many people left in total?
- e) Write a math statement that shows the arrivals and departures for the time period indicated. (Hint: Use positive numbers for arrivals, and negative numbers for departures.)
- f) Calculate the number of people on site (according to the information given) at 10:15 p.m.

## Task 2:

### Check Identification

Performing this task involves the following types of math:

- Integers (Algebra)

#### ► Level 1

2.1 Use the information below to answer questions a – c.

You are working your regular shift on May 31, 2005. As usual, you are required to check guests' identification to ensure they are 18 years of age.

- a) A young woman wishes to visit the casino. You check her ID and it says that her birthdate is January 23, 1987. Do you permit her to enter?
- b) A young man wants to enter the casino. His ID states that he was born November 12, 1986. Do you permit him to enter?
- c) A young man wants to enter the casino. His ID states that he was born July 3, 1987. Do you permit him to enter?

## Task 3:

### Count Money

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

## ► Level 1

3.1 Counting the money in a guest's lost purse, a guard finds:

Coins:

3 toonies  
2 loonies  
3 quarters  
4 dimes  
1 nickel  
2 pennies

Paper money:

4 twenty-dollar bills,  
1 ten-dollar bill and  
3 five-dollar bills.

What is the total amount of money?

## Task 4: Count Chips

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

## ► Level 1

- 4.1 How would you cut a full stack of white chips?
- 4.2 How would you count and cut a stack of 17 green chips?
- 4.3 How many chips are there in a full stack?
- 4.4 How would you cut and count a stack of 17 orange chips?
- 4.5 How would you cut and count a stack of 20 white chips?
- 4.6 What is the value of a full stack of black chips?

4.7 What is the value of a full stack of red chips?

► Level 2

4.8 Calculate the values of each of the following:

- a) 17 green chips
- b) 22 orange chips
- c) 23 white chips
- d) 4 black chips
- e) 2 yellow chips
- f) 18 red chips

4.9 Calculate the values of each of the following:

- a) 7 orange chips and 6 white chips
- b) 11 red chips and 4 green chips
- c) 6 red chips, 2 green chips, 1 black chip
- d) 3 orange chips, 3 white chips, 2 red chips, 1 green chip
- e) 14 white chips, 3 green chips
- f) 2 yellow chips, 12 orange chips

## Task 5: Count Drop

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

► Level 2

5.1 Use the information below to answer questions a – c.

At the casino games tables, dealers are required to deposit their cash winnings (or make a “drop”) every half-hour. When they make their drop, they enter the amount into a tally. At the end of each shift, the security investigator examines the tally total and the total cash dropped for discrepancies.

- a) At the end of one shift, the investigator found that the actual amount dropped was \$22,000.00 and the amount entered by the dealer was \$18,500.00. How much of a cash discrepancy was found?
- b) During another investigation, a guard counted a cash drop and

found \$16,793.00. The dealer's tally sheet showed \$16,973.00. How much was the discrepancy? What might have been the cause of the discrepancy?

- c) An investigator counted cash in the amount of \$19,006.00 at one table. The tally sheet showed that the dealer had dropped \$18,849.00. Was the discrepancy between the cash in the drop box and the dealer's tally the result of transposed figures on the dealer's tally sheet?

## Task 6:

# Calculate Salary and Hours

If you have trouble with any of these activities, review the Foundations Math Skills that are used for this task.

Performing this task involves the following types of math:

- Rates
- Integers (Algebra)
- Decimals
- Military time

### ► Level 2

6.1 Use the information below to answer questions a – e.

According to the contract, security guards are paid time and a half for call-out. For each call-out, a guard will be paid for a minimum of three hours.

- If his regular salary is \$9.00 per hour, how much pay will the guard receive for this call-out?
- If a guard's regular pay is \$9.30 per hour, and he is called out for a four-hour time period, how much pay will he receive for the call-out?
- If a guard's regular wages are \$9.55 per hour, how much will he earn for a pay period in which he worked 72 hours at his regular rate and  $5\frac{1}{2}$  hours at time and a half?
- A guard's regular shift is 08:00 to 16:30. He has a half-hour (unpaid time) for lunch. If he works this shift for 10 days, how many hours does he work?
- A guard works regular evenings: 15:00 – 24:00 hours, with a one-hour break (unpaid time) each shift. At \$9.50 per hour, what is his gross pay for five shifts?

## Task 7: Track Bets in Casino Games

Performing this task involves the following types of math:

- Percentages
- Decimals

### ► Level 3

- 7.1 In an eight-hour shift, the total amount wagered at a Blackjack table was \$18,525.00. There were 15 players.
- What was the average bet per player?
  - Over the eight-hour shift, what was the average bet per player per hour?
- 7.2 During the first half of an eight-hour shift, the total amount wagered at a Blackjack table was \$5,342.00. During the second half of the shift, the total amount wagered was \$8,688.00. What was the average wager per hour for that eight-hour period?
- 7.3 Use the information below to answer questions a – b.

Over one month, the wagering has been recorded at a particular table, and the average bet per player per hour has been calculated. The data shows that the average amount bet per player per hour is \$73.10. During holidays or special events, the amount wagered is expected to increase by 15% due to increased attendance.

- During a four-hour stretch one holiday evening, there were 27 players at the table being studied. The total amount wagered for the time period between 18:00 and 22:00 hours was \$7,525.00. Do these figures reflect a 15% increase in total bets over the average?
- The average wager during a four-hour stretch on a holiday evening was \$220.00 per player. How much more must be bet to achieve the 15% increase?

## Task 8:

# Track Fleet Costs

Performing this task involves the following types of math:

- Integers (Algebra)
- Rates
- Decimals
- Percentages

### ► Level 2

8.1 Use the information below to answer questions a – b.

There are 3 security mobile units. At the beginning of a particular shift, the mileage meters read as follows:

|            |            |
|------------|------------|
| Vehicle #1 | 97,345 km  |
| Vehicle #2 | 88,987 km  |
| Vehicle #3 | 107,351 km |

At the end of the shift, the mileage meters read as follows:

|            |            |
|------------|------------|
| Vehicle #1 | 97,399 km  |
| Vehicle #2 | 89,021 km  |
| Vehicle #3 | 107,353 km |

- What was the mileage put on to Vehicle #1? Vehicle #2? Vehicle #3?
- What was the total mileage used during this shift for the three vehicles?

8.2 Fuel mileage for mobile units is 55 km per litre. If the vehicles drove a total of 90 km during this shift, how many litres of fuel were burned?

### ► Level 3

8.3 Use the information below to answer questions a – c below.

*(Note that this information is provided for study purposes only.)*

Refer to the information in Level 2 problems (re: mileage). Also, assume that Triple Z can claim \$0.15 per km per unit as a tax write-off. The average mileage of each mobile unit is 60 km per 24-hour day. Gas costs \$0.90 per litre, and each unit gets 55 km/litre of gas.

The purchase price of each mobile unit is \$9,360.00. Triple Z is permitted to write off the depreciation of each unit at a rate of 20% of purchase cost per year over 5 years. At the end of 5 years, the units will be scrapped or sold for salvage.

- a) How much will the corporation write off as a mileage expense per unit for one tax year?
- b) What will be the average cost of gas for one week?
- c) How much depreciation can the corporation write off as depreciation expense over the first year? The second year? The third year? The fourth year? The fifth year?



**C**ompare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Numeracy Foundation section and try the activities again.

## Task 1: Track Guests

### ► Level 1

1.1

- a) 302
- b) 190
- c) 419

1.2

- a) 168
- b) 187, or 204 counting volunteers
- c)  $21 + 64 = 85$
- d) 167
- e)  $+64 + 2(52) - 33 + 17 - 21 + 7 - 64 + 12 - 49$
- f) Combine all positive numbers and all negative numbers. Then perform the calculation.  $+530 + 17 - 167 = 380$

## Task 2: Check Identification

### ► Level 1

2.1

- a) yes
- b) yes
- c) No

## Task 3: Count Money

### ► Level 1

3.1 \$114.22

## Task 4: Count Chips

### ► Level 1

4.1 4 stacks of 5 chips

4.2 4 stacks of 4 chips + 1 extra

4.3 20 chips of each color.

4.4 8 stacks of 2 + 1 extra

4.5 4 stacks of 5

4.6 black =  $\$100 \times 20$  chips = \$2,000.00

4.7 red =  $\$5 \times 20$  chips = \$100

### ► Level 2

4.8

- a)  $17 \times \$25.00 = \$425.00$
- b)  $22 \times \$0.50 = \$11.00$
- c)  $23 \times \$1.00 = \$23.00$
- d)  $4 \times \$100.00 = \$400.00$
- e)  $2 \times \$1,000.00 = \$2,000.00$
- f)  $18 \times \$5.00 = \$90.00$

4.9

- a)  $\$3.50 + \$6.00 = \$9.50$
- b)  $\$55.00 + \$100.00 = \$155.00$
- c)  $\$30.00 + \$50.00 + \$100.00 = \$180.00$
- d)  $\$1.50 + \$3.00 + \$10.00 + \$25.00 = \$39.50$
- e)  $\$14.00 + \$75.00 = \$89.00$
- f)  $\$2,000.00 + \$6.00 = \$2,006.00$

## Task 5: Count Drop

### ► Level 3

5.1

- a) \$3,500.00 cash not tallied.
- b)  $\$16,793.00 - \$16,973.00 = -\$180.00$ .

Cash is short \$180.00.

Note that if figures are transposed (written in reverse order), the error amount will be a number that is divisible by 9.

In this case, figures were transposed. That may be the cause for the discrepancy.

- c)  $\$19,006.00 - \$18,849.00 = \$157.00$ .

No.

Determine if a figure is divisible by 9 by adding all the digits. If the sum is divisible by 9, then the figure is also divisible by 9. In this case  $1 + 5 + 7 = 13$ , which doesn't divide evenly by 9.

## Task 6: Calculate Salary and Hours

### ► Level 2

6.1

- a) For a 3-hour call-out at time and a half:  $4.5 \times 9 = \$40.50$
- b)  $4 \text{ hrs @ } 1\frac{1}{2} \times \$9.30 = \$55.80$
- c)  $\$78.82 + \$687.60 = \$766.42$
- d)  $10 \times 8 = 80 \text{ hours}$
- e)  $5 \times 8 \times \$9.50 = \$380.00$

## Task 7: Track Bets in Casino Games

### ► Level 3

7.1

- a) \$1,235.00 per player
- b)  $\$1,235.00 \div 8 = \$154.38$  per player per hour

7.2  $\frac{\$5,342.00 + \$8,688.00}{8} = \frac{\$14,030.00}{8} = \$1,753.75$  per hour

7.3

- a) Average per player per hour = \$73.10.  
 $\$7,525.00 \div 4 = 1,881.25$  per hour  $\div 27 = \$69.67$  per player per hour.  
This doesn't exceed the average—it falls below.
- b)  $220 \div 4 + x = 73.10 + (0.15 \times 73.10)$   
 $55 + x = \$84.07$   
 $x = \$84.07 - 55$   
 $x = \$29.07$  per player per hour

## Task 8: Track Fleet Costs

### ► Level 2

8.1

- a) Vehicle #1 = 54 km  
Vehicle #2 = 34 km  
Vehicle #3 = 2 km
- b) 90 km

8.2  $90 \div 55$  km/litre = 1.64 litres

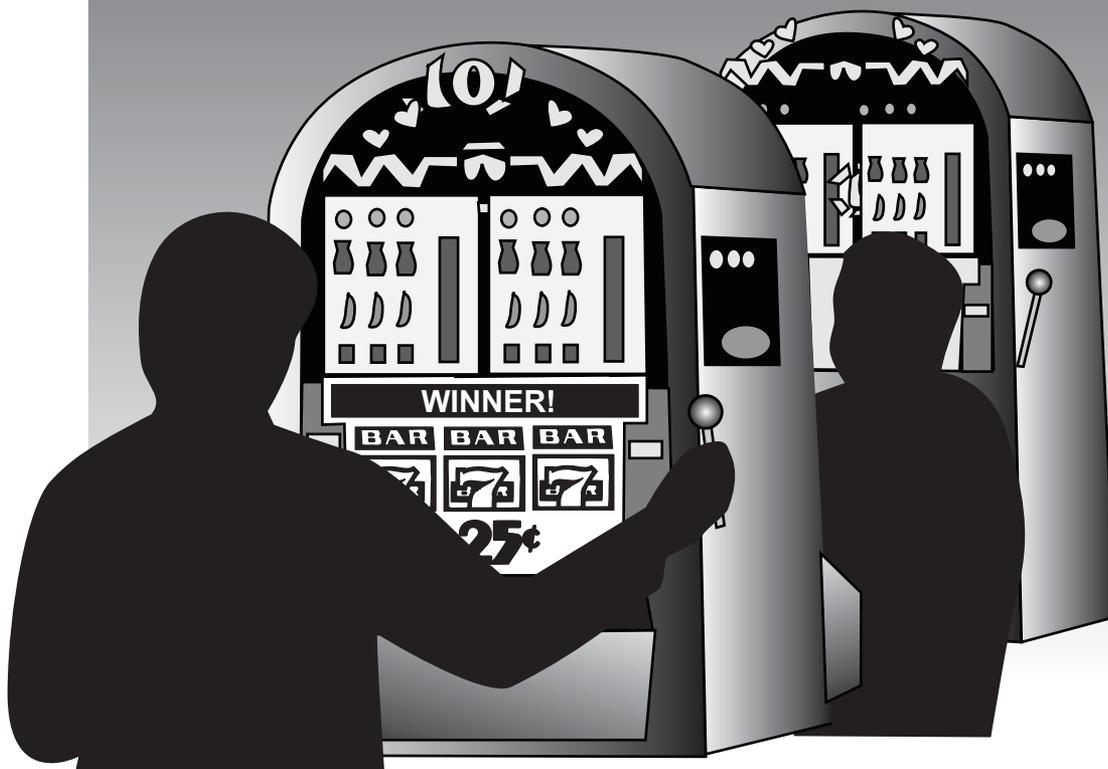
### ► Level 3

8.3

- a) \$3,285.00
- b)  $60$  km/day  $\times 7$  days/week = 420 km per week  $\times 0.90$  per litre + 55 km/litre = \$6.87
- c)  $20\% \times \$9,360.00 = \$1,872.00$  per year. Every year will be the same.

## Job Family Section

# Slots/Electronic Gaming/Bingo



# Introduction

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**T**his section deals with the Numeracy skills that Slots/Electronic Gaming/Bingo employees need to know. Employees working in this area read bingo product price lists, issue cashier exchange slips, review customer account slips, review balance sheets, review monthly balancing averages, calculate the cash value of winnings and vouchers, exchange chips for money, and estimate amounts of money.

These skills are important for people working in Slots/Electronic Gaming/Bingo because accuracy and comfort in dealing with money are critical to the success of both the casino and the employees.

In this section, you will practice how to:

- Calculate cash values
- Count cash
- Check calculations done by someone else
- Convert currency

Now it's your turn. Try these activities to practice the Numeracy skills you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundation Section: Counting Cash.

# Task 1: Calculate Cash Values

Performing this task involves the following types of Numeracy:

- Counting cash
- Decimals

## ► Level 1

1.1 Look at the value of the chips below. Use the information to calculate the cash value of the chips in the questions that follow, as well as for the other questions in this Level.

Orange: \$0.50

White: \$1.00

Red: \$5.00

Green: \$25.00

Black: \$100.00

a) 4 orange chips

b) 6 white chips

c) 4 red chips

d) 3 green chips

e) 2 black chips

1.2 Write an equation for each of the following. Find the value for each.

a) 5 green chips and 2 white chips

b) 10 orange chips and 1 red chip

c) 6 red chips and 1 green chip

d) 20 white chips and 1 red chip

e) 5 black chips and 4 green chips

1.3 One guest has \$40.00 worth of red chips. How many red chips does she have?

1.4 A guest is cashing in the following: 5 orange chips, 11 white and 6 black. How much cash should he get?

1.5 A guest asks for \$100.00 in black chips. How many chips does he get?

1.6 A guest asks for \$50.00 in white and red chips. Give two different ways that he can receive the chips.

## Task 2: Count Cash

Performing this task involves the following types of Numeracy:

- Counting cash
- Decimals

### ► Level 1

- 2.1 Read the following scenarios and answer the questions about counting cash for change.
- A customer needs change for a \$20.00. She would like all fives. How many fives do you give her?
  - A customer has \$40.00 and would like 7 fives, with the rest as loonies. What do you give him?
  - A customer has 6 loonies and 2 toonies and would like bills. What are two options that you could give him?
- 2.2 Calculate the value of each type of currency and add it up for the total cash value.
- 8 toonies
  - 13 loonies
  - 1 roll of nickels
  - 2 rolls of quarters
  - 23 \$5 bills
  - 14 tokens (each worth \$5)
  - Ticket-in ticket-out (TITO) receipts: \$12.50, \$15.25, \$22.75
  - What is the total cash value of the currency in questions a) to g)?
- 2.3 A guest would like you to give her change in \$5 bills for one \$50 bill and two \$20 bills. How many \$5 bills do you give her?

- 2.4 What is the total value of each of the following?
- a) 12 \$10 bills and 5 loonies
  - b) 10 \$20 bills, 35 \$5 bills, and 2 rolls of quarters
  - c) 5 \$50 bills and 5 rolls of nickels
  - d) 20 \$5 bills and 8 rolls of dimes
  - e) 13 toonies and 1 roll of loonies
- 2.5 You have a total of \$2,450.73. Your supervisor wants to decrease your cash so that you have \$500.00 on hand. How much should she take?
- 2.6 Calculate the total value for each of the following questions.
- a) 5 nickels
  - b) 23 dimes
  - c) 5 quarters
  - d) 25 toonies
  - e) 15 \$5 bills
  - f) 14 \$10 bills
  - g) 21 \$20 bills
  - h) 6 \$50 bills

# Task 3: Check Calculations Done by Someone Else

Performing this task involves the following types of Numeracy:

- Counting cash
- Decimals

## ► Level 1

3.1 A customer comes with the following vouchers and tells you she won \$25.75. How much money do you give her in exchange for the vouchers?

Machine Asset # 004285 CASINO CITY, MB R2X2H2

**JACKPOT VOUCHER**

**\$6.25**  
SIX DOLLARS AND TWENTY FIVE CENTS

11/15/2002 15:18:12 TICKET # 0002  
VALIDATION 00-62760364-5071-6865



Ticket Void after 30 days MACHINE # 3806201

INSERT THIS SIDE UP

00-62760364-5071-6865

Machine Asset # 004285 CASINO CITY, MB R2X2H2

**JACKPOT VOUCHER**

**\$9.25**  
NINE DOLLARS AND TWENTY FIVE CENTS

11/15/2002 15:18:12 TICKET # 0002  
VALIDATION 00-62760364-5071-6865



Ticket Void after 30 days MACHINE # 3806201

INSERT THIS SIDE UP

00-62760364-5071-6865

Machine Asset # 004285 CASINO CITY, MB R2X2H2

**JACKPOT RECEIPT**

**\$9.25**  
NINE DOLLARS AND TWENTY FIVE CENTS

11/15/2002 15:18:12 TICKET # 0002  
VALIDATION 00-62760364-5071-6865



Ticket Void after 30 days MACHINE # 3806201

INSERT THIS SIDE UP

00-62760364-5071-6865

3.2 You are talking to a customer who has a number of TITO receipts. She would like you to verify the following totals for her.

|  |                 |   |                  |
|--|-----------------|---|------------------|
|  | TITO receipts 1 | \$11.50, \$25.25, \$35.75, \$125.00,<br>\$145.00  | Total = \$342.50 |
|  | TITO receipts 2 | \$42.50, \$111.25, \$66.00, \$340.00,<br>\$215.00 | Total = \$774.75 |
|  | TITO receipts 3 | \$23.50, \$35.75, \$242.00, \$264.25,<br>\$222.50 | Total = \$787.75 |

Determine which one is incorrect.

Is there a quick way to find an error in this type of calculation?

3.3 Circle the error in the following list of totals.

3 rolls of loonies \$75.00

1 roll of quarters \$10.00

1 roll of nickels \$4.00

3 rolls of dimes \$25.00

10 rolls of pennies \$5.00

## Task 4: Convert Currency

Performing this task involves the following types of Numeracy:

- Counting cash
- Decimals

### ► Level 1

4.1 Answer the following questions.

- a) A guest has 230 credits at \$0.25 per credit. How much money does the guest have in credits?

*(Continue the question on the next page.)*

- b) A guest has 175 credits at \$0.50 per credit. How much money does the guest have in credits?
- c) A guest has 215 credits at \$0.05 per credit. How much money does the guest have in credits?
- d) A guest has 185 credits at \$0.02 per credit. How much money does the guest have in credits?
- e) A guest has 65 credits at \$1.00 per credit. How much money does the guest have in credits?

4.2 A guest started with 150 credits, lost 65 credits, and won 48 credits. The value of a credit is \$0.50.

- a) How many credits remain in the machine?
- b) How much money was gained or lost overall?



**C**ompare your answers with the answers below. If you have gotten less than half of the answers correct, review the material in the related Foundations sections and try the activities again.

- 1.1 a) \$2.00  
b) \$6.00  
c) \$20.00  
d) \$75.00  
e) \$200.00
- 1.2 a)  $(5 \times \$25.00) + (2 \times \$1.00) = \$127.00$   
b)  $(10 \times \$0.50) + (1 \times \$5.00) = \$10.00$   
c)  $(6 \times \$5.00) + (1 \times \$25.00) = \$55.00$   
d)  $(20 \times \$1.00) + (1 \times \$5.00) = \$25.00$   
e)  $(5 \times \$100.00) + (4 \times \$25.00) = \$600.00$
- 1.3 Red chips are worth \$5.00 each. She should get 8 chips.
- 1.4 Orange = \$2.50, white = \$11.00 and black = \$600.00.  
Total value = \$613.50
- 1.5 One
- 1.6 The possibilities are:  
4 red + 30 white

*(Continue the answer on the next page.)*

5 red + 25 white

6 red + 20 white

7 red + 15 white

8 red + 10 white

- 2.1 a) 4 fives  
b) 7 fives and 5 loonies  
c) Either 1 \$10.00 or 2 \$5.00s

- 2.2 a) \$16.00  
b) \$13.00  
c) \$2.00  
d) \$20.00  
e) \$115.00  
f) \$70.00  
g) \$50.50  
h) \$286.50

- 2.3 a) \$30.00  
b) \$2,000.00  
c) \$5,000.00

- 2.4 a)  $\$120 + \$5.00 = \$125.00$   
b)  $\$200.00 + \$175.00 + \$20.00 = \$395.00$   
c)  $\$250.00 + \$10.00 = \$260.00$   
d)  $\$100.00 + \$40.00 = \$140.00$

- e)  $\$26.00 + \$25.00 = \$51.00$
- 2.5 a) \$16.00
- b) \$13.00
- c) \$50.00
- d) \$500.00
- e) \$1,000.00
- f) \$115.00
- g) \$50.50
- h) Total = \$1,744.50
- 2.6 a) \$0.25
- b) \$2.30
- c) \$1.25
- d) \$25.00
- e) \$75.00
- f) \$140.00
- g) \$420.00
- h) \$300.00
- 3.1 \$24.75 is the total for the 3 receipts.
- 3.2 "TITO receipts 3" is incorrect. You can tell by looking at the cents. The total should be an even dollar amount.
- 3.3 Three rolls of dimes are worth \$5.00 each or a total of \$15.00 (not \$25.00).

4.1 a) \$57.50

b) \$87.50

c) \$10.75

d) \$3.70

e) \$65.00

4.2 a) 133

b)  $(150 \times \$0.50) - (17 \times \$0.50) = \$66.50$

# Job Family Section

## Table Games

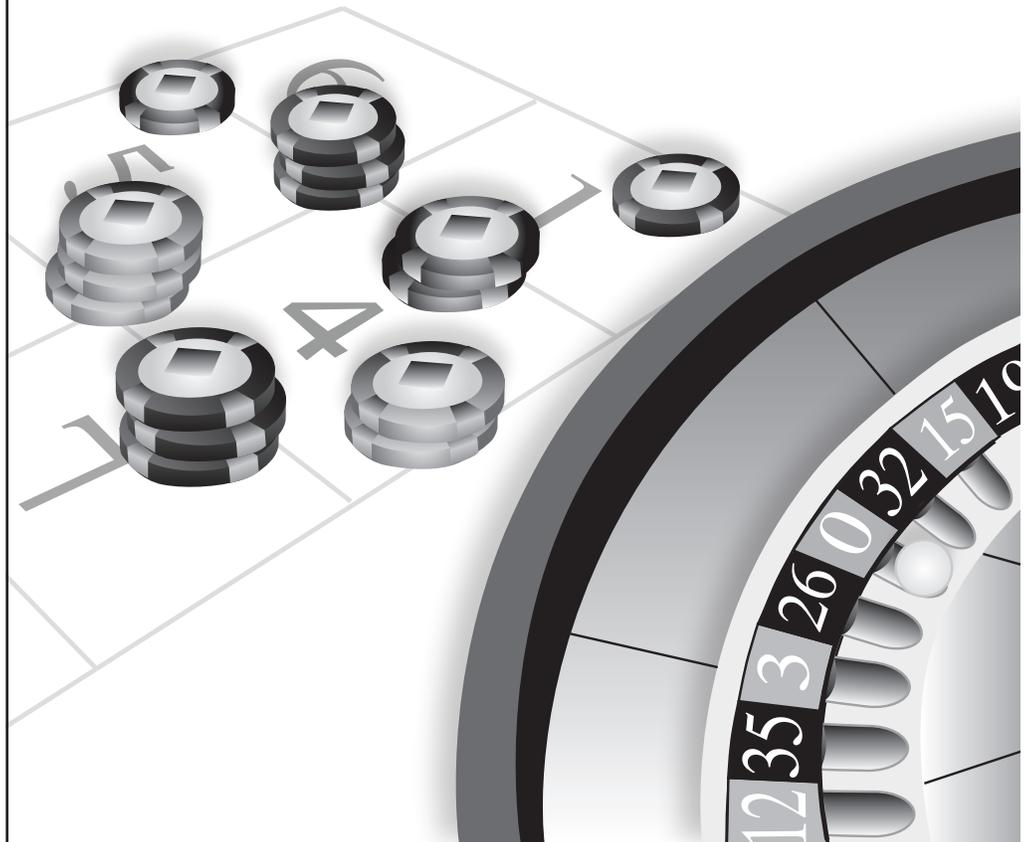


# Introduction

Employees of a casino who work in the table games department must perform many calculations quickly and accurately in their heads. They calculate odds in table games and keep track of bets and payouts. They count the value of chips and exchange them for correct denominations of money. They also must calculate commissions on bets.

In this section, you will practice how to:

- Calculate Bets, Odds and Payout
- Count the Cash Value of Chips
- Calculate Commissions



## SOMETHING TO CONSIDER

Table games employees should build their math skills by memorizing multiplication facts from 1 to 100. They can do this in several ways: using written lists or charts, flashcards, or oral recitation and repetition. The key is to practise often, but for brief periods of time. For example, you learn better by practicing for 10–15 minutes a day than by doing it for 1½ hours once a week. Remember: repetition is critical for memorization.

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.

### Task 1:

## Calculate Bets, Odds and Payout

Performing this task involves the following types of math:

- Ratio and Proportion (Algebra)
- Percentage

### ► Level 1

1.1 Problems a – f are based on the following information:

At the Roulette table, you must be able to pay out on bets up to \$25.00 on odds of 35:1, 17:1, 8:1, 11:1 and 5:1.

- A player bets \$15.00 on an Outside Column and wins. At 2:1 odds, how much do you pay out?
- A player bets \$22.00 on an Inside 6-Line and wins. At 5:1 odds, how much do you pay out?
- A player bets \$9.00 on the Inside Courtesy Line and wins. At 35:1 odds, how much do you pay out?
- A player bets \$17.50 on an Inside Street and wins. At 11:1 odds, how much do you pay out?
- A player bets \$19.00 on an Inside Corner and wins. At 8:1 odds, how much do you pay out?
- A player bets \$8.00 on an Inside Split and wins. At 17:1 odds, how much do you pay out?

Problems 1.2 – 1.7 are based on the following information:

Five percent commission is paid to the house from winnings at the Mini Baccarat table. Tie bets pay 8:1.

1.2 How much commission will be paid on winnings of:

- a) \$40.00
- b) \$56.00
- c) \$104.00
- d) \$32.00
- e) \$88.00
- f) \$100.00
- g) \$248.00
- h) \$360.00
- i) \$488.00
- j) \$170.00

1.3 How much do you pay a player (at 8:1 odds) on a bet of \$53.00?

1.4 How much do you pay a player (at 8:1 odds) on a bet of \$72.00?

1.5 How much is the payout (at 8:1 odds) on a bet of \$11.50?

1.6 What is the payout on a bet of \$14.00?

1.7 What is the payout on a bet of \$26.50?

Problems 1.8 – 1.10 are based on the following information.

At the Blackjack table, the house pays 3:2 or 150% of a bet if the player gets a Blackjack and the house does not. Assume that the player gets a Blackjack, and the house does not.

1.8 How much will the house pay out:

- a) on a bet of \$55.00?
- b) on a bet of \$10.00?
- c) on a bet of \$81.00?
- d) on a bet of \$23.00?
- e) on a bet of \$67.00?

- 1.9 What denominations of chips do you give guests for the following payouts?
- a) \$125.00
  - b) \$52.50
  - c) \$47.00
  - d) \$150.50
  - e) \$235.00
- 1.10 The dealer has a Jack and an 8 showing. Which of the following hands beats the dealer's hand?
- a) 4, 5 and 8
  - b) 6, 7 and 10
  - c) 10, 9 and 2
  - d) 9, 8 and 5
  - e) 10, 3 and 2

## ► Level 2

- 1.11 Calculate the payout for each of these combination bets.
- a) \$3.00 at 3:1 and \$3.00 at 17:1
  - b) \$10.00 at 17:1 and \$10.00 at 8:1
  - c) \$2.00 at 11:1 and \$20.00 at 2:1
  - d) \$25.00 at 8:1 and \$25.00 at 5:1
  - e) \$50.00 at 17:1 and \$40.00 at 2:1
  - f) \$13.00 at 35:1 and \$75.00 at 8:1
  - g) \$120.00 at 11:1 and \$85.00 at 5:1
  - h) \$8.00 at 35:1, \$18.00 at 17:1 and \$24.00 at 11:1
  - i) \$50.00 at 6:1, \$25.00 at 17:1, and \$60.00 at 5:1
  - j) \$65.00 at 8:1, \$25.00 at 11:1 and \$10.00 at 35:1
- 1.12 In one two-hour time period, the total bets at a gaming table were \$4,270.00. There were 7 people playing. What was the average bet per player for that period?

## ► Level 3

- 1.13 At the Roulette table, there are two winners. Calculate the total payout for the game.

Player A bets \$20.00 on an outside column (at 2:1 odds) and wins.  
Player B bets \$25.00 on an outside column (at 2:1 odds) and wins.

1.14 At a Roulette table, five people are playing. Calculate the total payout for the game, and what the house collected for the game.

Player 1 bets \$15.00 on an Inside Corner and wins.  
Player 2 bets \$11.00 on an Inside Street and loses.  
Player 3 bets \$16.00 on an Outside Column and loses.  
Player 4 bets \$22.00 on an Outside Column and loses.  
Player 5 bets \$19.00 on an Inside Corner and wins.

1.15 At a Roulette table, six people are playing. Calculate the total payout for the game, and what the house collected for the game.

Player 1 bets \$15.00 on an Inside Courtesy Line and wins.  
Player 2 bets \$25.00 on an Outside Column and loses.  
Players 3 & 4 bet \$10.00 each on an Inside Split and lose.  
Player 5 bets \$18.00 on an Outside Column and loses.  
Player 6 bets \$12.00 on an Inside Courtesy Line and wins.

1.16 Questions a – d are based on the following information:

At a Blackjack table, there are three players. The game is being played with one deck that includes two Jokers. Their hands are as follows:

|           |                             |
|-----------|-----------------------------|
| Player #1 | 6 of hearts, 7 of diamonds  |
| Player #2 | 5 of hearts, King of spades |
| Player #3 | 8 of spades, Queen of clubs |
| Dealer    | 10 of spades, 7 of clubs    |

- a) What are the odds that the next card dealt will be an 8?
- b) What are the odds that the next card dealt will be a 6 of spades?
- c) What are the odds that the next card dealt will be a 4?
- d) What are the odds that the next card will not be an Ace?

1.17 A player makes a \$20.00 dollar bet at 8:1 odds and wins. The house collects 5% commission from his winnings. How much commission does the dealer collect?

1.18 A player makes a \$103.00 bet at 8:1 odds and wins. The house collects 5% commission from his winnings. How much will the player receive after the commission has been paid?

1.19 A player makes a \$355.00 bet at 8:1 odds and wins. The house collects 5% commission from his winnings. How much will he receive? How much commission will he pay?

1.20 A player makes a \$69.00 bet (8:1 odds) at the Baccarat table and wins. How much commission does the house collect?

1.21 At one of the table games, the odds are 15:1. The house collects 5% commission from winnings. A player places a bet of \$162.00 and wins. How much commission will the dealer collect after the winnings are paid?

1.22 Two players make the following bets at 8:1 odds and win. They both pay 5% commission to the house. How much commission does the dealer collect from both players?

Player A     \$10.00

Player B     \$40.00

1.23 Two players make the following bets at 8:1 odds and win. They both pay 5% commission to the house. How much does the dealer pay out to both players after collecting commission?

Player A     \$32.00

Player B     \$50.00

1.24 Questions a and b are based on the following information.

At the Baccarat table, two players bet \$60.00 each at 8-1 odds. They both win.

a) How much does the house pay out?

b) How much commission does the house collect from both wins?

1.25 Questions a and b are based on the following information.

A player wins a bet of \$45.00 at 8:1 odds. She wants to collect half of her winnings in \$5.00 chips and collect the balance in cash, from which she will pay 5% commission to the house.

a) How much does the house pay out?

b) How much commission does the house collect from both wins?

1.26 Questions a – c are based on the following information.

At one of the table games, the odds are 15:1. The house collects 5% commission from all winnings. The game proceeds as follows.

Player #1 bets \$23.00 and wins.  
Player #2 bets \$40.00 and loses.  
Player #3 bets \$120.00 and loses.  
Player #4 bets \$70.00 and loses.  
Player #5 bets \$62.00 and wins.

- a) What is the total that the house wins for this game?
- b) What is the total that the house pays out for this game?
- c) What is the total commission that the house collects for this game?

## Task 2:

# Count the Cash Value of Chips

Performing this task involves the following types of math:

- Cash on Hand (Counting Cash)

### ► Level 1

- 2.1 What is the value of 49 chips worth \$5.00 each?
- 2.2 What is the value of 93 chips worth \$2.00 each?
- 2.3 How many \$5.00 chips are needed to make \$165.00 bet?
- 2.4 How many \$2.00 chips are needed to make a \$96.00 bet?
- 2.5 How many \$25.00 chips are needed to make a \$350.00 bet?

### ► Level 2

- 2.6 A player wins \$1,390.00. He wants \$1,000.00 in cash. How many \$5.00 chips do you give him?
- 2.7 A player wins \$734.00. She wants \$350.00 in cash. How many chips do you give her (\$25.00, \$5.00 and \$2.00)?

- 2.8 A player wants to cash in 75 chips worth \$25.00 each. How much cash do you give him with 35 chips of the same denomination?
- 2.9 A player wants to cash in 169 chips worth \$5.00 each. How much cash do you give her with 95 chips of the same denomination?
- 2.10 A player wants to cash in 941 chips worth \$2.00 each. If you give him back 100 chips of the same denomination, how much cash must you also give him?
- 2.11 A player wins at Blackjack on a \$475.00 bet. What denominations of chips would the dealer use to pay out his winnings?
- 2.12 A player wins at Blackjack on a \$335.00 bet. What denominations of chips would the dealer use to pay out his winnings?
- 2.13 A player wins at Blackjack on a bet of \$183.00. She asks to be paid in \$25.00 chips. How many \$25.00 chips will she receive? How many of the smaller denominations will be needed to pay out the full amount?



Compare your answers for the activities with the answers below. If you have gotten less than half the answers correct, review the material in the Foundation section and try the activities again.

## Task 1:

## Calculate Bets, Odds and Payout

### ► Level 1

1.1

- a) \$30.00
- b) \$110.00
- c) \$315.00
- d) \$192.50
- e) \$152.00
- f) \$136.00

1.2

- a) \$2.00
- b) \$2.80
- c) \$5.20
- d) \$1.60
- e) \$4.40
- f) \$5.00
- g) \$12.40
- h) \$18.00
- i) \$24.40
- j) \$8.50

1.3 \$424.00

1.4 \$576.00

1.5 \$92.00

1.6  $\$112.00 - \$5.60 = \$106.40$

1.7  $\$212.00 - \$10.60 = \$201.40$

1.8

- a) \$82.50
- b) \$15.00
- c) \$121.50
- d) \$34.50
- e) \$100.50

1.9

- a) 1 black, 1 green
- b) 2 green, 2 white, 1 orange
- c) 1 green, 4 red, 2 white
- d) 1 black, 2 green, 1 orange
- e) 2 black, 1 green, 2 red

1.10 The answer is c.

## ► Level 2

1.11

- a) \$60.00
- b) \$250.00
- c) \$62.00
- d) \$325.00
- e) \$930.00
- f) \$1,055.00
- g) \$1,745.00
- h) \$850.00
- i) \$1,025.00
- j) \$1,145.00

1.12 \$610.00

## ► Level 3

1.13 Player A wins \$40.00. Player B wins \$50.00.

1.14 Total paid out for the game = \$272.00. Total collected by the house = \$49.00.

1.15 Total paid out for the game = \$945.00. Total collected by the house =

\$63.00.

1.16

- a)  $3/46$  chance that the next card will be an 8
- b)  $1/46$  chance that the next card will be the 6 of spades
- c)  $4/46$  chance or  $2/23$  chance that the next card will be a 4
- d) Odds that the next card will be an Ace are  $4/46$  or  $2/23$ , so the complementary odds (the odds that it will not be an Ace) are  $21/23$

1.17  $\$20.00 \times 8 \times 0.05 = \$8.00$

1.18  $\$103.00 \times 8$  (winnings) -  $\$103.00 \times 8 \times 0.05$  (commission) =  $\$782.80$

1.19  $\$355.00 \times 8 = \$2840.00$  (winnings)  
 $\$355.00 \times 8 \times 0.05 = \$142.00$  (commission)

1.20  $\$69.00 \times 8 \times 0.05 = \$27.60$

1.21  $\$162.00 \times 15 = \$2,430.00$  winnings  $\times 0.05 = \$121.50$  commission

1.22 Total commission collected from both players =  $\$20.00$ .

1.23 Player A receives  $\$243.20$  and Player B receives  $\$380.00 = \$623.20$  in total after commission is collected.

1.24

- a)  $\$912.00$  is paid out.
- b) The house takes  $\$48.00$  in commission.

1.25

- a) 36/\$5 chips
- b)  $\$162.00$

1.26

- a) House takes in =  $\$230.00$
- b) Total paid out by house =  $\$1,275.00$
- c) Total commission collected by the house =  $\$63.75$

## Task 2:

# Count Cash Value of Chips

### ► Level 1

2.1 \$245.00

2.2 \$186.00

2.3 33 chips

2.4 48 chips

2.5 14 chips

### ► Level 2

2.6 78

2.7 15 green, 1 red and 4 white

2.8 \$1,000.00 cash

2.9 \$370.00 cash

2.10  $\$841.00 \times 2 = \$1,682.00$  in cash

2.11  $\$712.50 = 7$  black, 2 red, 2 white and 1 orange

2.12  $\$502.50 = 5$  black, 2 white and 1 orange

2.13  $\$274.50 = 10$  green, 4 red, 4 white and 1 orange

# Introduction

This section will deal with the math skills that employees in the Uniforms Department need to know. These workers must keep track of numbers of uniforms used by casino employees. They must know how much cleaning solution is needed to clean the uniforms and how often uniforms must be cleaned. They must accurately measure the materials needed for altering and repairing the uniforms. They must also know how to calculate the cost of uniforms.

In this section, you will practice how to:

- Count Uniforms
- Calculate Measurements for Altering Uniforms
- Calculate the Cost of Buying, Altering and Caring for Uniforms

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

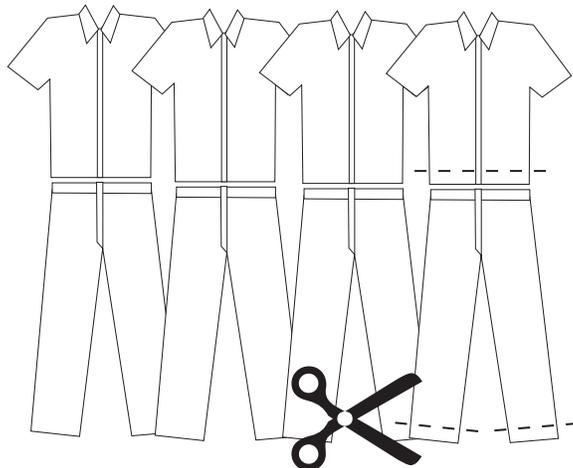
If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.

## Task 1:

### Count Uniforms

Performing this task involves the following types of math:

- Integers (Algebra)



## ► Level 1

1.1 Every day Maxine counts and records the number of garments that have been dropped off for cleaning. She usually takes a cumulative total every three days, and then a final total at the end of the month. Below is a list of the totals she has recorded for the first six days of the month.

| Date | Garment Count | Accumulated Total | Three-day Total |
|------|---------------|-------------------|-----------------|
| 1    | 530           | 530               |                 |
| 2    | 525           | 1,055             |                 |
| 3    | 490           | 1,545             | 1,545           |
| 4    | 601           | 601               |                 |
| 5    | 520           | 1,121             |                 |
| 6    | 485           | 1,606             |                 |
| 7    | 550           |                   |                 |
| 8    | 505           |                   |                 |
| 9    | 642           |                   |                 |
| 10   |               |                   |                 |
| 11   |               |                   |                 |
| 12   |               |                   |                 |
| 13   |               |                   |                 |
| 14   |               |                   |                 |
| 15   |               |                   |                 |
| 16   |               |                   |                 |
| 17   |               |                   |                 |
| 18   |               |                   |                 |
| 19   |               |                   |                 |
| 20   |               |                   |                 |
| 21   |               |                   |                 |
| 22   |               |                   |                 |
| 23   |               |                   |                 |
| 24   |               |                   |                 |
| 25   |               |                   |                 |
| 26   |               |                   |                 |
| 27   |               |                   |                 |
| 28   |               |                   |                 |
| 29   |               |                   |                 |
| 30   |               |                   |                 |

- Calculate the accumulated totals for the 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> days.
- Enter the following totals for the remaining days of the month, and run an accumulated total for each three-day period.

10<sup>th</sup> 495  
11<sup>th</sup> 550  
12<sup>th</sup> 580  
13<sup>th</sup> 598  
14<sup>th</sup> 554  
15<sup>th</sup> 630  
16<sup>th</sup> 622  
17<sup>th</sup> 599  
18<sup>th</sup> 660  
19<sup>th</sup> 620  
20<sup>th</sup> 605  
21<sup>st</sup> 565  
22<sup>nd</sup> 489  
23<sup>rd</sup> 496  
24<sup>th</sup> 504  
25<sup>th</sup> 580  
26<sup>th</sup> 580  
27<sup>th</sup> 592  
28<sup>th</sup> 495  
29<sup>th</sup> 500  
30<sup>th</sup> 505

- c) What is the total number of garments turned in for cleaning during this month?
  - d) What is the average number of garments turned in per day? (Use the 30-day month to calculate average and round off to a whole number.)
  - e) Last month, the total number was 17,032. What is the difference between last month's total and this month's total?
  - f) There were 31 days last month. What was the average number of garments dropped off per day last month? (Round off to a whole number.)
  - g) Each pail of cleaning solution is supposed to clean 1,550 garments. How many pails will be needed to clean all the garments that were dropped off during the current month?
- 1.2 The Triple Z Company supplies uniforms to about 800 full-time employees. If each employee has to have four shirts, how many shirts will be ordered?
- 1.3 If a vest is expected to last for 50 cleanings, and each vest is cleaned every five days, how many days is a vest expected to last? How many months?

## Task 2:

# Calculate Measurements for Altering Uniforms

Performing this task involves the following types of math:

- Integers (Algebra)
- Fractions
- Metric and Imperial Systems

### ► Level 1

- 2.1 Mary is a Uniform Technician. One of the casino employees has dropped off a pair of pants to be altered. Mary measured the employee's inseam; it is 29". The pants are 33" long. She needs 1" of fabric to make a standard hem. How much fabric does she have to cut off the bottoms of the legs of these pants?
- 2.2 The standard measurement for a pair of ladies' size 12 pants is waist = 30" and hips = 39". The standard measurements of a pair of ladies' size 10 pants are as follows: waist = 28" and hips = 36". Corrine's waist is 29" and her hips measure 36". Which size pants should she be given? What alterations might be required?
- 2.3 An employee has dropped off a jacket to be altered. The sleeves need to be shortened. Mary measured this employee and found that she needed a sleeve length of  $25\frac{1}{2}$ ". The sleeves on her jacket measured  $26\frac{1}{4}$ ". By how much does Mary have to shorten the sleeves on this jacket?
- 2.4 The seam allowance for pants and shirts is  $\frac{5}{8}$ ". To cut the back of a shirt, you must allow  $\frac{5}{8}$ " on both sides of the piece that is cut. If you need a finished garment that measures 21" across the back, how wide a panel do you need to cut to include proper seam allowance?
- 2.5 When uniforms are ordered, only part of the total order is cut. In this case, two-thirds of the uniforms ordered will be cut. If 660 uniform shirts are ordered, how many shirts will be cut? If 450 pairs of pants are ordered, how many will be cut?
- 2.6 If each shirt requires  $2\frac{3}{8}$  yards of fabric, how much fabric will be needed to cut the portion of the order discussed in question 2.5?
- 2.7 If each pair of pants requires  $1\frac{3}{4}$  yards of fabric (60" wide), how much fabric will be needed to cut the portion of the order discussed in question 2.5?

## Task 3:

# Calculate the Cost of Buying, Altering and Caring for Uniforms

Performing this task involves the following types of math:

- Integers (Algebra)
- Decimals
- Fractions
- Percentages
- Rates



Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

### ► Level 1

3.1 Use the following information to answer questions a – b.

Some Triple Z employees are reimbursed for the cost of shoes and boots. The employee buys the shoes or boots and submits proof of purchase to the uniforms department. The price limit for shoes, including taxes, is \$125.00. The price limit for boots including taxes is \$175.00.



- What is the highest price (before taxes) that is covered for shoes?
- What is the highest price (before taxes) that is covered for boots?

### ► Level 2

3.2 Use the following information to solve questions a – j.

In the *security department*, there are 18 full-time workers, including 4 full-time supervisors, and 7 part-time workers.

In the *grounds department*, there are 18 full-time workers, including 2 full-time supervisors, and 8 part-time workers.

In the *housekeeping department*, there are 18 full-time workers, including 3 full-time supervisors, and 5 part-time workers.

In the *casino/games department*, there are 40 full-time workers, including 10 full-time supervisors, and 30 part-time workers.

**Full-time employees** receive four shirts and three pairs of pants for work.

**Part-time and casual employees** receive three shirts and two pairs of pants for work.

**Each employee** receives one vest.

**Each supervisor** receives one blazer.

In addition to the above uniform clothing, security and grounds workers each get one parka, one pair of shoes, one pair of boots, two hats, two scarves and two pairs of mitts/gloves.

The cost of uniform garments (not including taxes) is as follows:

|        |  |
|--------|--|
| Shirts | \$11.10 each (note exception for security staff) |
| Pants  | \$18.50 each (note exception for security staff) |
| Blazer | \$25.50 each                                     |
| Vest   | \$21.00 each (estimate)                          |
| Parka  | \$65.00 each                                     |
| Hat    | \$4.25 each                                      |
| Scarf  | \$4.55 each                                      |

Shoes and boots are purchased and designated separately.

- a) How many shirts and pants should be ordered to outfit security staff?
- b) If the average cost of a shirt for a security guard is \$12.50 and the average cost for a pair of pants is \$25.95, how much will it cost (before taxes) to outfit the security staff with shirts and pants?
- c) If 60% of the uniforms ordered are cut, how many security uniforms will be cut?
- d) How much will it cost to outfit the grounds and housekeeping departments with shirts and pants?
- e) The Triple Z Company has a contract for dry-cleaning. The cleaner charges 7% PST and 6% GST on all cleaning services. It costs \$15.00 to clean a parka, \$8.00 to clean a hat, and \$2.25 to clean a scarf. Calculate the cost of dry-cleaning for grounds and security staff outerwear. (Parkas, hats, and scarves are each cleaned once a year at the end of every season.)
- f) Casino supervisors wear blazers, which must be dry-cleaned every two weeks. It costs \$9.00 to clean one of these blazers. If there are ten casino supervisors and they each have one blazer, what is the cost of cleaning for one year for these garments (including taxes)?
- g) Each drum of detergent in the laundry room contains 200 gallons (US) of detergent. If one drum washes 4000 loads, how many ounces of detergent are used to wash one load?
- h) Refer to question g above. At 25 loads per day, how long would a drum last?

- i) If a front-loading washing machine uses 25% less detergent, how long would a 200-gallon drum last?
- j) Refer to the information in question g to answer the following. The new washing machines in the laundry room will wash 60 lb. of laundry, or four loads per day. Assuming that the quantity of laundry has not changed, calculate the load weight that the old washers could wash. (Hint: set up a proportion to answer this question.)

3.3 The head of the Uniform Department is shopping for mitts and gloves. He has contacted three local merchants, and has three price quotations that are outlined below. What is the best buy if he needs to buy 30 pairs of gloves, 36 pairs of mitts, and requires delivery within 30 days? Look at the three options below and decide which is the best choice.

- a) Supplier #1 recommends leather gloves and mitts.  
Leather gloves cost \$18.00 a pair, and are fully guaranteed for heavy outdoor use for 12 months. Leather mitts cost \$16.50 a pair, and are fully guaranteed for heavy outdoor use for 12 months. Prices do not include PST or GST. A 10% discount will be given on orders over \$500.00. Delivery is within ten days.
- b) Supplier #2 recommends nylon mitts and leather gloves.  
Leather gloves cost \$20.50 a pair and nylon mitts cost \$11.25 a pair. A full 12 month warranty can be purchased for an additional 5% of the price before taxes. GST and PST apply. Delivery time is six weeks.
- c) Supplier #3 recommends a new line of synthetic gloves and mitts, but with leather palms. The gloves cost \$21.50 a pair, and the mitts cost \$12.50 a pair. They are fully guaranteed for heavy use for 12 months. Delivery is within 30 days. A purchase discount of 7.5% is applied to all orders that are paid within 30 days of the date of delivery.

3.4 Use the information below to answer questions a – d.

A ladies' medium-size vest requires  $1 \frac{3}{8}$  yards of fabric and  $1 \frac{1}{4}$  yard for the lining. The fabric that has been selected for the outer layer of the vests is a cotton blend that is expected to shrink 10%. The lining fabric will not shrink. Each ladies' vest will be finished with a 12" zipper closure. Every vest will have a Triple Z logo embroidered onto the right front panel.

- a) Medium-size vests will be ordered for 100 female employees. How much fabric (outer layer and lining) will be needed to cut one-half of the total vests ordered? Remember to account for 10% shrinkage of the outer layer fabric.



- b) The fabric costs \$9.50 per yard (outer layer) and \$3.25 per yard (lining). What will be the cost of the fabric needed for the vests that are to be cut?
- c) The men's vests close with buttons, and the women's vests close with zippers. Buttons cost \$2.50 per dozen, and 12" zippers cost \$0.89 each. For the vests that are to be cut for this particular order, how much will the zippers cost?
- d) The embroidery for each garment costs \$0.95. What will be the total cost for embroidery for all vests that are cut for this order?

### ► Level 3

- 3.5 Calculate the total cost of a ladies' medium-size vest using the information given in Task 3, Level 2, question 3.4, a – d.
- 3.6 Use the information given above to calculate the cost of outfitting one supervisor with the following garments: four shirts, three pairs of pants, one blazer and one pair of shoes (not including taxes). (assume maximum shoe allowance)
- 3.7 How much will it cost before taxes to provide the casino supervisors and the housekeeping supervisors with uniforms?
- 3.8 Use the information you have to calculate the cost before taxes of outfitting a housekeeping employee with the following: four shirts, three pairs of pants, two vests and one pair of shoes. (Use the estimated price from 3.2 for the vests and maximum shoe allowance.)
- 3.9 How much will it cost before taxes to outfit all of the full-time housekeeping staff (excluding supervisors)?
- 3.10 Use the information given earlier to calculate the cost of outfitting a grounds employee with the following: one parka, two pairs of gloves, two hats, two scarves, four pairs of pants, three shirts, one pair of shoes and one pair of boots.
- 3.11 How much will it cost to outfit all of the grounds employees, including supervisors?
- 3.12 As the uniform department supervisor, you have to submit a budget that outlines the cost of cleaning, repairing, altering and manufacturing staff uniforms. Based on all the information given in the preceding questions, calculate the cost of outfitting 26 grounds staff, 23 housekeeping staff and 70 casino staff (see question 3.2 for number of full-time and part-time

staff). Create a summary (by garment) of the total costs of purchasing all of the uniform garments. (assume maximum value for shoes and boots)

3.13 It is estimated that the cost of cleaning, altering and repairing uniforms is 55% of the purchase price. For the departments covered, how much should you budget for these services in the upcoming year?

3.14 Based on a cost increase of 15%, what amount will you be asking for in your budget for the upcoming year?



Compare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

**Task 1:**

**Count Uniforms**

► **Level 1**

1.1

a) and b)

| Date            | Garment Count | Accumulated Total | Three-day Total |
|-----------------|---------------|-------------------|-----------------|
| 1               | 530           | 530               |                 |
| 2               | 525           | 1,055             |                 |
| 3               | 490           | 1,545             | 1,545           |
| 4               | 601           | 601               |                 |
| 5               | 520           | 1,121             |                 |
| 6               | 485           | 1,606             | 1,606           |
| 7               | 550           | 550               |                 |
| 8               | 505           | 1,055             |                 |
| 9               | 642           | 1,697             | 1,697           |
| 10              | 495           | 495               |                 |
| 11              | 550           | 1,045             |                 |
| 12              | 580           | 1,625             | 1,625           |
| 13              | 598           | 598               |                 |
| 14              | 554           | 1,152             |                 |
| 15              | 630           | 1,782             | 1,782           |
| 16              | 622           | 622               |                 |
| 17              | 599           | 1,221             |                 |
| 18              | 660           | 1,881             | 1,881           |
| 19              | 620           | 620               |                 |
| 20              | 605           | 1,225             |                 |
| 21              | 565           | 1,790             | 1,790           |
| 22              | 489           | 489               |                 |
| 23              | 496           | 985               |                 |
| 24              | 504           | 1,489             | 1,489           |
| 25              | 580           | 580               |                 |
| 26              | 580           | 1,160             |                 |
| 27              | 592           | 1,752             | 1,752           |
| 28              | 495           | 495               |                 |
| 29              | 500           | 995               |                 |
| 30              | 505           | 1,500             | 1,500           |
| Total for month | 16,667        |                   |                 |
| 3-day average   |               |                   | 1,667           |

- c) Total garments for month = 16,667
- d)  $16,667 \div 30 = 556$  (rounded to whole number)
- e) Difference =  $17,032 - 16,667 = 365$
- f)  $17,032 \div 31 = 549$  (rounded to whole number)
- g)  $16,667 \div 1,550 = 10.75$  pails. Round up to 11 pails

1.2  $800 \times 4$  shirts each = 3,200 shirts

1.3  $5 \times 50 = 250$  days, or just over 8 months ( $250 \div 365 \times 12$ )

## Task 2:

# Calculate Measurements for Altering Uniforms

### ► Level 1

2.1  $29 + 1 = 30''$  required.  $33 - 30 = 3''$  to be cut

2.2 If the seam allowance is big enough to enable you to let the pants out 1'', use the size 10's. If not, you will have to use the size 12's and take in cloth at the hips.

2.3  $26\frac{1}{4} - 25\frac{1}{2} = \frac{3}{4}''$

2.4  $21 + 2(5/8) = 22\frac{1}{4}''$

2.5  $660 \times 2/3 = 440$  shirts.  $450 \times 2/3 = 300$  pants

2.6  $2\frac{3}{8} \times 440 = 1,045$  yards

2.7  $1\frac{3}{4} \times 300 = 525$  yards

## Task 3:

# Calculate the Cost of Buying, Altering and Caring for Uniforms

### ► Level 1

3.1

- a)  $x + 0.13x = \$125.00$ .  $1.13x = \$125.00$ .  $\$125.00 \div 1.13 = \$110.62$
- b)  $x + 0.13x = \$175.00$ .  $1.13x = \$175.00$ .  $\$175.00 \div 1.13 = \$154.87$

## ► Level 2

3.2

- a)  $18 \text{ full-time} \times 4 \text{ shirts per person} = 72 \text{ shirts}$   
 $18 \text{ full-time} \times 3 \text{ pants per person} = 54 \text{ pairs of pants}$   
 $7 \text{ part-time} \times 3 \text{ shirts per person} = 21 \text{ shirts}$   
 $7 \text{ part-time} \times 2 \text{ pants per person} = 14 \text{ pairs of pants}$   
**Total to be ordered** = 93 shirts and 68 pairs of pants
- b)  $\$12.50 \times (72 + 21) = \$12.50 \times 93 = \$1,162.50$   
 $\$25.95 \times (54 + 14) = \$25.95 \times 68 = \$1,764.60$   
**Total** = \$2,927.10
- c) 56 shirts and 41 pairs of pants should be cut. (Note that values are rounded off to whole numbers.)
- d)  $36 \text{ full-time staff} \times 4 \text{ shirts} + 13 \text{ part-time staff} \times 3 \text{ shirts} = 183 \text{ shirts}$   
 $\times \$11.10 \text{ per shirt} = \$2,031.30$   
 $36 \text{ full-time staff} \times 3 \text{ pants} + 13 \text{ part-time staff} \times 2 \text{ pants} = 134 \text{ pairs of pants}$   
 $\times \$18.50 \text{ per pair} = \$2,479.00$   
**Total** = \$4,510.30
- e) Grounds = 26 staff  
Security = 25 staff  
Total number of staff with outerwear = 51  
 $51 \text{ parkas} \times \$15.00 = \$765.00$   
 $102 \text{ hats} \times \$8.00 = \$816.00$   
 $102 \text{ scarves} \times \$2.25 = \$229.50$   
**Total** = \$1,810.50 plus 6% GST and 7% PST = \$1,810.50 + (\$ 108.63 + \$126.74 ) = \$2,045.87
- f)  $10 \text{ blazers} \times \$9.00 = \$90.00$  cleaning  $\times 26 \text{ cleanings} = \$2,340.00$  plus 7% PST and 6% GST = \$2,644.20
- g) At 128 oz. per gallon, 200 gals = 25,600 oz.  $\div 4,000 \text{ loads} = 6.4 \text{ oz. per load}$
- h)  $6.4 \times 25 = 160 \text{ oz. per day. } 25,600 \div 160 = 160 \text{ days}$
- i) 160 less 25% = 120 oz. per day.  $25,600 \div 120 = 213 \frac{1}{3} \text{ days}$ . It will last 213 days, leaving 40 oz.
- j)  $25x = 4 \text{ times } 60. 25x = 240. 240 \div 25 = 9.6 \text{ lb. per load}$

3.3 Option b can be eliminated immediately, as 6 weeks delivery is unacceptable.

Option a will cost \$1,153.27.

Option c will cost \$1,144.54.

Therefore option c is the best buy.

3.4

- a) Shell =  $[(100 \times 1 \frac{3}{8}) \div 0.90] \div 2 = [(100 \times 1.375) \div 0.90] \div 2 = [137.5 \div 0.90] \div 2 = 76.39 \text{ yards}$ . Lining =  $(1\frac{1}{4} \times 100) \div 2 = (1.25 \times 100) \div 2 = 62.5 \text{ yards}$
- b)  $9.50 \times 76.39 \text{ yards} = 725.71$

$$3.25 \times 62.5 \text{ yards} = 203.13$$

c) For the 50 vests to be cut, the zippers will cost \$0.89 each for a total of \$44.50.

$$d) 50 \text{ vests} \times \$0.95 = \$47.50$$

### ► Level 3

3.5 1 ladies' medium-size vest:

$$\text{shell} = 1 \frac{3}{8} \text{ yards} \div 0.90 = 1.53 \text{ yards @ } \$9.50 \text{ per yard} = \$14.51$$

$$\text{lining} = 1 \frac{1}{4} \text{ yards @ } \$3.25 \text{ per yard} = \$4.06$$

$$\text{zipper @ } \$0.89 \text{ each} = \$0.89$$

$$\text{embroidered logo @ } \$0.95 \text{ each} = \$0.95$$

**Total      \$20.41**

3.6 One casino supervisor needs:

$$4 \text{ shirts @ } \$11.10 = \$44.40$$

$$3 \text{ pants @ } \$18.50 = \$55.50$$

$$1 \text{ blazer @ } \$25.50 = \$25.50$$

$$1 \text{ pair shoes @ } \$110.62 = \$110.62$$

**Total                      =      \$236.02**

$$3.7 \quad \$236.02 \times (10 + 3) = \$3,068.26$$

3.8 One full-time housekeeper needs:

$$4 \text{ shirts @ } \$11.10 = \$44.40$$

$$3 \text{ pants @ } \$18.50 = \$55.50$$

$$2 \text{ vests @ } \$21.00 = \$42.00$$

$$1 \text{ pair shoes @ } \$110.62 = \$110.62$$

**Total                      =      \$252.52**

$$3.9 \quad 15 \times \$252.52 = \$3,787.80$$

3.10 One grounds employee needs:

$$1 \text{ parka @ } \$65.00 = \$65.00$$

$$2 \text{ gloves @ } \$21.50 = \$43.00$$

$$2 \text{ hats @ } \$4.25 = \$8.50$$

$$2 \text{ scarves @ } \$4.55 = \$9.10$$

$$4 \text{ pants @ } \$18.50 = \$74.00$$

$$3 \text{ shirts @ } \$11.10 = \$33.30$$

$$1 \text{ pair shoes @ } \$110.62 = \$110.62$$

$$1 \text{ pair boots @ } \$153.51 = \$153.51$$

**Total                      =      \$497.03**

3.11  $18 \times \$497.03 = \$8,946.54$

3.12

| Item/Dept    | Grounds        | H'keeping      | Casino              | Total   |
|--------------|----------------|----------------|---------------------|---|
| Parka        | 26             |                |                     | $26 \times \$65.00 = \$1,690.00$  |
| Hats         | 52             |                |                     | $52 \times \$4.25 = \$221.00$   |
| Scarves      | 52             |                |                     | $52 \times \$4.55 = \$236.60$   |
| Gloves/mitts | 52             |                |                     | Gloves: $26 \times \$21.50 =$<br>\$559.00<br>Mitts: $26 \times \$12.50 =$<br>\$325.00 |
| Boots        | 26             |                |                     | $26 \times \$155.87 = \$4,026.62$   |
| Shoes        | 26             | 23             | 70                  | $119 \times \$110.65 = \$13,163.73$   |
| Pants        | $54 + 16 = 70$ | $54 + 10 = 64$ | $120 + 60 =$<br>180 | $314 \times \$18.50 = \$5,809.00$   |
| Shirts       | $72 + 24 = 96$ | $72 + 15 = 87$ | $160 + 90 =$<br>250 | $433 \times \$11.10 = \$4,806.30$   |
| Vest         | 24             | 20             | 60                  | $104 \times \$21.00 = \$2,184.00$   |
| Blazer       | 2              | 3              | 10                  | $15 \times \$25.50 = \$382.50$  |

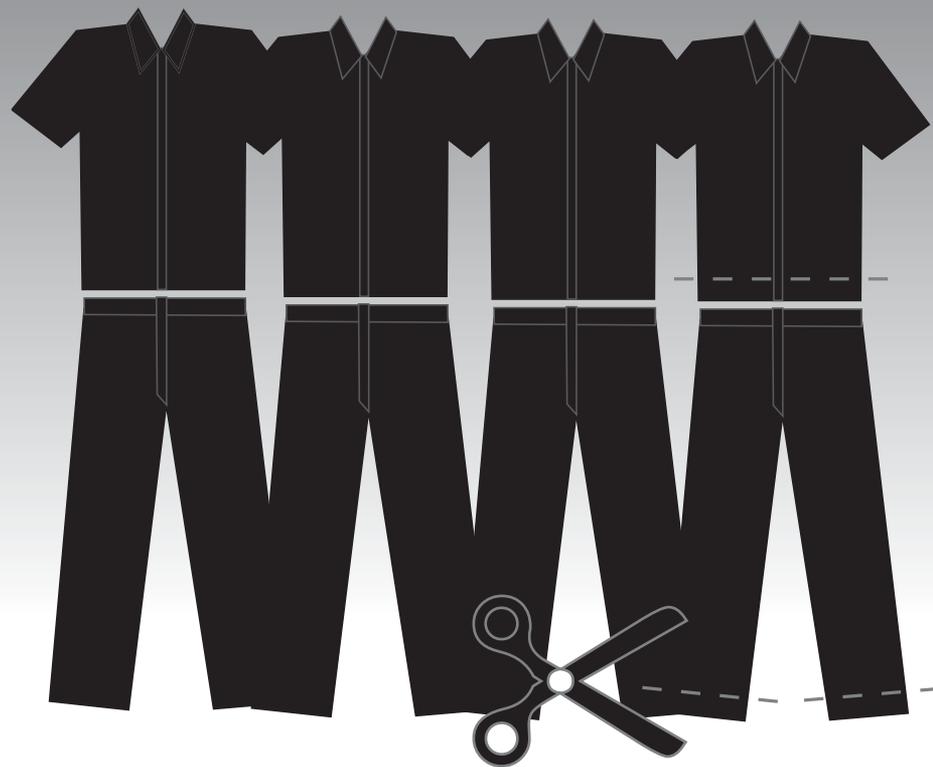
See the table above for cost totals. Total for all departments shown = \$33,403.20.

3.13 The amount to be spent cleaning, altering and repairing uniforms is  
 $\$33,403.20 \times 0.55 = \$18,371.76$ .

3.14 The amount to be requested for next year's budget =  
 $(\$33,403.20 + \$18,371.76) \times 1.15 = \$59,541.20$ . GST and PST are not included in these totals.

# Job Family Section

## Uniforms



# Introduction

This section will deal with the math skills that employees in the Uniforms Department need to know. These workers must keep track of numbers of uniforms used by casino employees. They must know how much cleaning solution is needed to clean the uniforms and how often uniforms must be cleaned. They must accurately measure the materials needed for altering and repairing the uniforms. They must also know how to calculate the cost of uniforms.

In this section, you will practice how to:

- Count Uniforms
- Calculate Measurements for Altering Uniforms
- Calculate the Cost of Buying, Altering and Caring for Uniforms

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

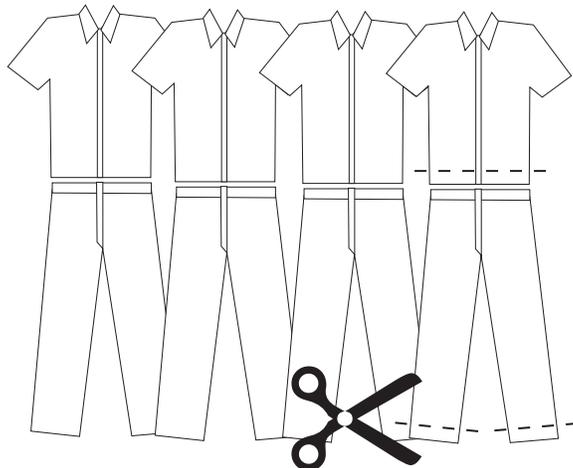
If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.

## Task 1:

### Count Uniforms

Performing this task involves the following types of math:

- Integers (Algebra)



## ► Level 1

1.1 Every day Maxine counts and records the number of garments that have been dropped off for cleaning. She usually takes a cumulative total every three days, and then a final total at the end of the month. Below is a list of the totals she has recorded for the first six days of the month.

| Date | Garment Count | Accumulated Total | Three-day Total |
|------|---------------|-------------------|-----------------|
| 1    | 530           | 530               |                 |
| 2    | 525           | 1,055             |                 |
| 3    | 490           | 1,545             | 1,545           |
| 4    | 601           | 601               |                 |
| 5    | 520           | 1,121             |                 |
| 6    | 485           | 1,606             |                 |
| 7    | 550           |                   |                 |
| 8    | 505           |                   |                 |
| 9    | 642           |                   |                 |
| 10   |               |                   |                 |
| 11   |               |                   |                 |
| 12   |               |                   |                 |
| 13   |               |                   |                 |
| 14   |               |                   |                 |
| 15   |               |                   |                 |
| 16   |               |                   |                 |
| 17   |               |                   |                 |
| 18   |               |                   |                 |
| 19   |               |                   |                 |
| 20   |               |                   |                 |
| 21   |               |                   |                 |
| 22   |               |                   |                 |
| 23   |               |                   |                 |
| 24   |               |                   |                 |
| 25   |               |                   |                 |
| 26   |               |                   |                 |
| 27   |               |                   |                 |
| 28   |               |                   |                 |
| 29   |               |                   |                 |
| 30   |               |                   |                 |

- Calculate the accumulated totals for the 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> days.
- Enter the following totals for the remaining days of the month, and run an accumulated total for each three-day period.

10<sup>th</sup> 495  
11<sup>th</sup> 550  
12<sup>th</sup> 580  
13<sup>th</sup> 598  
14<sup>th</sup> 554  
15<sup>th</sup> 630  
16<sup>th</sup> 622  
17<sup>th</sup> 599  
18<sup>th</sup> 660  
19<sup>th</sup> 620  
20<sup>th</sup> 605  
21<sup>st</sup> 565  
22<sup>nd</sup> 489  
23<sup>rd</sup> 496  
24<sup>th</sup> 504  
25<sup>th</sup> 580  
26<sup>th</sup> 580  
27<sup>th</sup> 592  
28<sup>th</sup> 495  
29<sup>th</sup> 500  
30<sup>th</sup> 505

- c) What is the total number of garments turned in for cleaning during this month?
  - d) What is the average number of garments turned in per day? (Use the 30-day month to calculate average and round off to a whole number.)
  - e) Last month, the total number was 17,032. What is the difference between last month's total and this month's total?
  - f) There were 31 days last month. What was the average number of garments dropped off per day last month? (Round off to a whole number.)
  - g) Each pail of cleaning solution is supposed to clean 1,550 garments. How many pails will be needed to clean all the garments that were dropped off during the current month?
- 1.2 The Triple Z Company supplies uniforms to about 800 full-time employees. If each employee has to have four shirts, how many shirts will be ordered?
- 1.3 If a vest is expected to last for 50 cleanings, and each vest is cleaned every five days, how many days is a vest expected to last? How many months?

## Task 2:

# Calculate Measurements for Altering Uniforms

Performing this task involves the following types of math:

- Integers (Algebra)
- Fractions
- Metric and Imperial Systems

### ► Level 1

- 2.1 Mary is a Uniform Technician. One of the casino employees has dropped off a pair of pants to be altered. Mary measured the employee's inseam; it is 29". The pants are 33" long. She needs 1" of fabric to make a standard hem. How much fabric does she have to cut off the bottoms of the legs of these pants?
- 2.2 The standard measurement for a pair of ladies' size 12 pants is waist = 30" and hips = 39". The standard measurements of a pair of ladies' size 10 pants are as follows: waist = 28" and hips = 36". Corrine's waist is 29" and her hips measure 36". Which size pants should she be given? What alterations might be required?
- 2.3 An employee has dropped off a jacket to be altered. The sleeves need to be shortened. Mary measured this employee and found that she needed a sleeve length of  $25\frac{1}{2}$ ". The sleeves on her jacket measured  $26\frac{1}{4}$ ". By how much does Mary have to shorten the sleeves on this jacket?
- 2.4 The seam allowance for pants and shirts is  $\frac{5}{8}$ ". To cut the back of a shirt, you must allow  $\frac{5}{8}$ " on both sides of the piece that is cut. If you need a finished garment that measures 21" across the back, how wide a panel do you need to cut to include proper seam allowance?
- 2.5 When uniforms are ordered, only part of the total order is cut. In this case, two-thirds of the uniforms ordered will be cut. If 660 uniform shirts are ordered, how many shirts will be cut? If 450 pairs of pants are ordered, how many will be cut?
- 2.6 If each shirt requires  $2\frac{3}{8}$  yards of fabric, how much fabric will be needed to cut the portion of the order discussed in question 2.5?
- 2.7 If each pair of pants requires  $1\frac{3}{4}$  yards of fabric (60" wide), how much fabric will be needed to cut the portion of the order discussed in question 2.5?

## Task 3:

# Calculate the Cost of Buying, Altering and Caring for Uniforms

Performing this task involves the following types of math:

- Integers (Algebra)
- Decimals
- Fractions
- Percentages
- Rates



Note: Assume that the GST is 6.0% and the PST is 7.0% unless otherwise stated.

### ► Level 1

3.1 Use the following information to answer questions a – b.

Some Triple Z employees are reimbursed for the cost of shoes and boots. The employee buys the shoes or boots and submits proof of purchase to the uniforms department. The price limit for shoes, including taxes, is \$125.00. The price limit for boots including taxes is \$175.00.



- What is the highest price (before taxes) that is covered for shoes?
- What is the highest price (before taxes) that is covered for boots?

### ► Level 2

3.2 Use the following information to solve questions a – j.

In the *security department*, there are 18 full-time workers, including 4 full-time supervisors, and 7 part-time workers.

In the *grounds department*, there are 18 full-time workers, including 2 full-time supervisors, and 8 part-time workers.

In the *housekeeping department*, there are 18 full-time workers, including 3 full-time supervisors, and 5 part-time workers.

In the *casino/games department*, there are 40 full-time workers, including 10 full-time supervisors, and 30 part-time workers.

**Full-time employees** receive four shirts and three pairs of pants for work.

**Part-time and casual employees** receive three shirts and two pairs of pants for work.

**Each employee** receives one vest.

**Each supervisor** receives one blazer.

In addition to the above uniform clothing, security and grounds workers each get one parka, one pair of shoes, one pair of boots, two hats, two scarves and two pairs of mitts/gloves.

The cost of uniform garments (not including taxes) is as follows:

|        |  |
|--------|--|
| Shirts | \$11.10 each (note exception for security staff) |
| Pants  | \$18.50 each (note exception for security staff) |
| Blazer | \$25.50 each                                     |
| Vest   | \$21.00 each (estimate)                          |
| Parka  | \$65.00 each                                     |
| Hat    | \$4.25 each                                      |
| Scarf  | \$4.55 each                                      |

Shoes and boots are purchased and designated separately.

- a) How many shirts and pants should be ordered to outfit security staff?
- b) If the average cost of a shirt for a security guard is \$12.50 and the average cost for a pair of pants is \$25.95, how much will it cost (before taxes) to outfit the security staff with shirts and pants?
- c) If 60% of the uniforms ordered are cut, how many security uniforms will be cut?
- d) How much will it cost to outfit the grounds and housekeeping departments with shirts and pants?
- e) The Triple Z Company has a contract for dry-cleaning. The cleaner charges 7% PST and 6% GST on all cleaning services. It costs \$15.00 to clean a parka, \$8.00 to clean a hat, and \$2.25 to clean a scarf. Calculate the cost of dry-cleaning for grounds and security staff outerwear. (Parkas, hats, and scarves are each cleaned once a year at the end of every season.)
- f) Casino supervisors wear blazers, which must be dry-cleaned every two weeks. It costs \$9.00 to clean one of these blazers. If there are ten casino supervisors and they each have one blazer, what is the cost of cleaning for one year for these garments (including taxes)?
- g) Each drum of detergent in the laundry room contains 200 gallons (US) of detergent. If one drum washes 4000 loads, how many ounces of detergent are used to wash one load?
- h) Refer to question g above. At 25 loads per day, how long would a drum last?

- i) If a front-loading washing machine uses 25% less detergent, how long would a 200-gallon drum last?
- j) Refer to the information in question g to answer the following. The new washing machines in the laundry room will wash 60 lb. of laundry, or four loads per day. Assuming that the quantity of laundry has not changed, calculate the load weight that the old washers could wash. (Hint: set up a proportion to answer this question.)

3.3 The head of the Uniform Department is shopping for mitts and gloves. He has contacted three local merchants, and has three price quotations that are outlined below. What is the best buy if he needs to buy 30 pairs of gloves, 36 pairs of mitts, and requires delivery within 30 days? Look at the three options below and decide which is the best choice.

- a) Supplier #1 recommends leather gloves and mitts.  
Leather gloves cost \$18.00 a pair, and are fully guaranteed for heavy outdoor use for 12 months. Leather mitts cost \$16.50 a pair, and are fully guaranteed for heavy outdoor use for 12 months. Prices do not include PST or GST. A 10% discount will be given on orders over \$500.00. Delivery is within ten days.
- b) Supplier #2 recommends nylon mitts and leather gloves.  
Leather gloves cost \$20.50 a pair and nylon mitts cost \$11.25 a pair. A full 12 month warranty can be purchased for an additional 5% of the price before taxes. GST and PST apply. Delivery time is six weeks.
- c) Supplier #3 recommends a new line of synthetic gloves and mitts, but with leather palms. The gloves cost \$21.50 a pair, and the mitts cost \$12.50 a pair. They are fully guaranteed for heavy use for 12 months. Delivery is within 30 days. A purchase discount of 7.5% is applied to all orders that are paid within 30 days of the date of delivery.

3.4 Use the information below to answer questions a – d.

A ladies' medium-size vest requires  $1 \frac{3}{8}$  yards of fabric and  $1 \frac{1}{4}$  yard for the lining. The fabric that has been selected for the outer layer of the vests is a cotton blend that is expected to shrink 10%. The lining fabric will not shrink. Each ladies' vest will be finished with a 12" zipper closure. Every vest will have a Triple Z logo embroidered onto the right front panel.

- a) Medium-size vests will be ordered for 100 female employees. How much fabric (outer layer and lining) will be needed to cut one-half of the total vests ordered? Remember to account for 10% shrinkage of the outer layer fabric.



- b) The fabric costs \$9.50 per yard (outer layer) and \$3.25 per yard (lining). What will be the cost of the fabric needed for the vests that are to be cut?
- c) The men's vests close with buttons, and the women's vests close with zippers. Buttons cost \$2.50 per dozen, and 12" zippers cost \$0.89 each. For the vests that are to be cut for this particular order, how much will the zippers cost?
- d) The embroidery for each garment costs \$0.95. What will be the total cost for embroidery for all vests that are cut for this order?

### ► Level 3

- 3.5 Calculate the total cost of a ladies' medium-size vest using the information given in Task 3, Level 2, question 3.4, a – d.
- 3.6 Use the information given above to calculate the cost of outfitting one supervisor with the following garments: four shirts, three pairs of pants, one blazer and one pair of shoes (not including taxes). (assume maximum shoe allowance)
- 3.7 How much will it cost before taxes to provide the casino supervisors and the housekeeping supervisors with uniforms?
- 3.8 Use the information you have to calculate the cost before taxes of outfitting a housekeeping employee with the following: four shirts, three pairs of pants, two vests and one pair of shoes. (Use the estimated price from 3.2 for the vests and maximum shoe allowance.)
- 3.9 How much will it cost before taxes to outfit all of the full-time housekeeping staff (excluding supervisors)?
- 3.10 Use the information given earlier to calculate the cost of outfitting a grounds employee with the following: one parka, two pairs of gloves, two hats, two scarves, four pairs of pants, three shirts, one pair of shoes and one pair of boots.
- 3.11 How much will it cost to outfit all of the grounds employees, including supervisors?
- 3.12 As the uniform department supervisor, you have to submit a budget that outlines the cost of cleaning, repairing, altering and manufacturing staff uniforms. Based on all the information given in the preceding questions, calculate the cost of outfitting 26 grounds staff, 23 housekeeping staff and 70 casino staff (see question 3.2 for number of full-time and part-time

staff). Create a summary (by garment) of the total costs of purchasing all of the uniform garments. (assume maximum value for shoes and boots)

3.13 It is estimated that the cost of cleaning, altering and repairing uniforms is 55% of the purchase price. For the departments covered, how much should you budget for these services in the upcoming year?

3.14 Based on a cost increase of 15%, what amount will you be asking for in your budget for the upcoming year?



Compare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

**Task 1:**

**Count Uniforms**

► **Level 1**

1.1  
a) and b)

| Date            | Garment Count | Accumulated Total | Three-day Total |
|-----------------|---------------|-------------------|-----------------|
| 1               | 530           | 530               |                 |
| 2               | 525           | 1,055             |                 |
| 3               | 490           | 1,545             | 1,545           |
| 4               | 601           | 601               |                 |
| 5               | 520           | 1,121             |                 |
| 6               | 485           | 1,606             | 1,606           |
| 7               | 550           | 550               |                 |
| 8               | 505           | 1,055             |                 |
| 9               | 642           | 1,697             | 1,697           |
| 10              | 495           | 495               |                 |
| 11              | 550           | 1,045             |                 |
| 12              | 580           | 1,625             | 1,625           |
| 13              | 598           | 598               |                 |
| 14              | 554           | 1,152             |                 |
| 15              | 630           | 1,782             | 1,782           |
| 16              | 622           | 622               |                 |
| 17              | 599           | 1,221             |                 |
| 18              | 660           | 1,881             | 1,881           |
| 19              | 620           | 620               |                 |
| 20              | 605           | 1,225             |                 |
| 21              | 565           | 1,790             | 1,790           |
| 22              | 489           | 489               |                 |
| 23              | 496           | 985               |                 |
| 24              | 504           | 1,489             | 1,489           |
| 25              | 580           | 580               |                 |
| 26              | 580           | 1,160             |                 |
| 27              | 592           | 1,752             | 1,752           |
| 28              | 495           | 495               |                 |
| 29              | 500           | 995               |                 |
| 30              | 505           | 1,500             | 1,500           |
| Total for month | 16,667        |                   |                 |
| 3-day average   |               |                   | 1,667           |

- c) Total garments for month = 16,667
- d)  $16,667 \div 30 = 556$  (rounded to whole number)
- e) Difference =  $17,032 - 16,667 = 365$
- f)  $17,032 \div 31 = 549$  (rounded to whole number)
- g)  $16,667 \div 1,550 = 10.75$  pails. Round up to 11 pails

1.2  $800 \times 4$  shirts each = 3,200 shirts

1.3  $5 \times 50 = 250$  days, or just over 8 months ( $250 \div 365 \times 12$ )

## Task 2:

# Calculate Measurements for Altering Uniforms

### ► Level 1

2.1  $29 + 1 = 30''$  required.  $33 - 30 = 3''$  to be cut

2.2 If the seam allowance is big enough to enable you to let the pants out 1'', use the size 10's. If not, you will have to use the size 12's and take in cloth at the hips.

2.3  $26\frac{1}{4} - 25\frac{1}{2} = \frac{3}{4}''$

2.4  $21 + 2(5/8) = 22\frac{1}{4}''$

2.5  $660 \times 2/3 = 440$  shirts.  $450 \times 2/3 = 300$  pants

2.6  $2\frac{3}{8} \times 440 = 1,045$  yards

2.7  $1\frac{3}{4} \times 300 = 525$  yards

## Task 3:

# Calculate the Cost of Buying, Altering and Caring for Uniforms

### ► Level 1

3.1

- a)  $x + 0.13x = \$125.00$ .  $1.13x = \$125.00$ .  $\$125.00 \div 1.13 = \$110.62$
- b)  $x + 0.13x = \$175.00$ .  $1.13x = \$175.00$ .  $\$175.00 \div 1.13 = \$154.87$

## ► Level 2

3.2

- a)  $18 \text{ full-time} \times 4 \text{ shirts per person} = 72 \text{ shirts}$   
 $18 \text{ full-time} \times 3 \text{ pants per person} = 54 \text{ pairs of pants}$   
 $7 \text{ part-time} \times 3 \text{ shirts per person} = 21 \text{ shirts}$   
 $7 \text{ part-time} \times 2 \text{ pants per person} = 14 \text{ pairs of pants}$   
**Total to be ordered** = 93 shirts and 68 pairs of pants
- b)  $\$12.50 \times (72 + 21) = \$12.50 \times 93 = \$1,162.50$   
 $\$25.95 \times (54 + 14) = \$25.95 \times 68 = \$1,764.60$   
**Total** = \$2,927.10
- c) 56 shirts and 41 pairs of pants should be cut. (Note that values are rounded off to whole numbers.)
- d)  $36 \text{ full-time staff} \times 4 \text{ shirts} + 13 \text{ part-time staff} \times 3 \text{ shirts} = 183 \text{ shirts}$   
 $\times \$11.10 \text{ per shirt} = \$2,031.30$   
 $36 \text{ full-time staff} \times 3 \text{ pants} + 13 \text{ part-time staff} \times 2 \text{ pants} = 134 \text{ pairs of pants}$   
 $\times \$18.50 \text{ per pair} = \$2,479.00$   
**Total** = \$4,510.30
- e) Grounds = 26 staff  
Security = 25 staff  
Total number of staff with outerwear = 51  
 $51 \text{ parkas} \times \$15.00 = \$765.00$   
 $102 \text{ hats} \times \$8.00 = \$816.00$   
 $102 \text{ scarves} \times \$2.25 = \$229.50$   
**Total** = \$1,810.50 plus 6% GST and 7% PST = \$1,810.50 +  
(\$ 108.63 + \$126.74 ) = \$2,045.87
- f)  $10 \text{ blazers} \times \$9.00 = \$90.00$  cleaning  $\times 26 \text{ cleanings} = \$2,340.00$  plus  
7% PST and 6% GST = \$2,644.20
- g) At 128 oz. per gallon, 200 gals = 25,600 oz.  $\div 4,000 \text{ loads} = 6.4 \text{ oz. per load}$
- h)  $6.4 \times 25 = 160 \text{ oz. per day. } 25,600 \div 160 = 160 \text{ days}$
- i) 160 less 25% = 120 oz. per day.  $25,600 \div 120 = 213 \frac{1}{3} \text{ days}$ . It will last 213 days, leaving 40 oz.
- j)  $25x = 4 \text{ times } 60. 25x = 240. 240 \div 25 = 9.6 \text{ lb. per load}$

3.3 Option b can be eliminated immediately, as 6 weeks delivery is unacceptable.

Option a will cost \$1,153.27.

Option c will cost \$1,144.54.

Therefore option c is the best buy.

3.4

- a) Shell =  $[(100 \times 1 \frac{3}{8}) \div 0.90] \div 2 = [(100 \times 1.375) \div 0.90] \div 2 =$   
 $[137.5 \div 0.90] \div 2 = 76.39 \text{ yards. Lining} = (1\frac{1}{4} \times 100) \div 2 = (1.25$   
 $\times 100) \div 2 = 62.5 \text{ yards}$
- b)  $9.50 \times 76.39 \text{ yards} = 725.71$

$$3.25 \times 62.5 \text{ yards} = 203.13$$

c) For the 50 vests to be cut, the zippers will cost \$0.89 each for a total of \$44.50.

$$d) 50 \text{ vests} \times \$0.95 = \$47.50$$

### ► Level 3

3.5 1 ladies' medium-size vest:

$$\text{shell} = 1 \frac{3}{8} \text{ yards} \div 0.90 = 1.53 \text{ yards @ } \$9.50 \text{ per yard} = \$14.51$$

$$\text{lining} = 1 \frac{1}{4} \text{ yards @ } \$3.25 \text{ per yard} = \$4.06$$

$$\text{zipper @ } \$0.89 \text{ each} = \$0.89$$

$$\text{embroidered logo @ } \$0.95 \text{ each} = \$0.95$$

**Total      \$20.41**

3.6 One casino supervisor needs:

$$4 \text{ shirts @ } \$11.10 = \$44.40$$

$$3 \text{ pants @ } \$18.50 = \$55.50$$

$$1 \text{ blazer @ } \$25.50 = \$25.50$$

$$1 \text{ pair shoes @ } \$110.62 = \$110.62$$

**Total      =      \$236.02**

$$3.7 \quad \$236.02 \times (10 + 3) = \$3,068.26$$

3.8 One full-time housekeeper needs:

$$4 \text{ shirts @ } \$11.10 = \$44.40$$

$$3 \text{ pants @ } \$18.50 = \$55.50$$

$$2 \text{ vests @ } \$21.00 = \$42.00$$

$$1 \text{ pair shoes @ } \$110.62 = \$110.62$$

**Total      =      \$252.52**

$$3.9 \quad 15 \times \$252.52 = \$3,787.80$$

3.10 One grounds employee needs:

$$1 \text{ parka @ } \$65.00 = \$65.00$$

$$2 \text{ gloves @ } \$21.50 = \$43.00$$

$$2 \text{ hats @ } \$4.25 = \$8.50$$

$$2 \text{ scarves @ } \$4.55 = \$9.10$$

$$4 \text{ pants @ } \$18.50 = \$74.00$$

$$3 \text{ shirts @ } \$11.10 = \$33.30$$

$$1 \text{ pair shoes @ } \$110.62 = \$110.62$$

$$1 \text{ pair boots @ } \$153.51 = \$153.51$$

**Total      =      \$497.03**

3.11  $18 \times \$497.03 = \$8,946.54$

3.12

| Item/Dept    | Grounds        | H'keeping      | Casino              | Total   |
|--------------|----------------|----------------|---------------------|---|
| Parka        | 26             |                |                     | $26 \times \$65.00 = \$1,690.00$  |
| Hats         | 52             |                |                     | $52 \times \$4.25 = \$221.00$   |
| Scarves      | 52             |                |                     | $52 \times \$4.55 = \$236.60$   |
| Gloves/mitts | 52             |                |                     | Gloves: $26 \times \$21.50 =$<br>\$559.00<br>Mitts: $26 \times \$12.50 =$<br>\$325.00 |
| Boots        | 26             |                |                     | $26 \times \$155.87 = \$4,026.62$   |
| Shoes        | 26             | 23             | 70                  | $119 \times \$110.65 = \$13,163.73$   |
| Pants        | $54 + 16 = 70$ | $54 + 10 = 64$ | $120 + 60 =$<br>180 | $314 \times \$18.50 = \$5,809.00$   |
| Shirts       | $72 + 24 = 96$ | $72 + 15 = 87$ | $160 + 90 =$<br>250 | $433 \times \$11.10 = \$4,806.30$   |
| Vest         | 24             | 20             | 60                  | $104 \times \$21.00 = \$2,184.00$   |
| Blazer       | 2              | 3              | 10                  | $15 \times \$25.50 = \$382.50$  |

See the table above for cost totals. Total for all departments shown = \$33,403.20.

3.13 The amount to be spent cleaning, altering and repairing uniforms is  
 $\$33,403.20 \times 0.55 = \$18,371.76$ .

3.14 The amount to be requested for next year's budget =  
 $(\$33,403.20 + \$18,371.76) \times 1.15 = \$59,541.20$ . GST and PST are not included in these totals.

# Job Family Section

## Warehouse



# Introduction

**W**arehouse workers in the gaming industry must know how to count with a high level of accuracy. They read and match detailed information codes on stock when doing inventory. They count and track warehouse stock coming in and leaving the warehouse. They estimate weight of stock for shipping and receiving, as well as the area that stock will take up in the warehouse. They also estimate the time it takes to take inventory of specific items.

In this section, you will practice how to:

- Read Stock Codes Accurately
- Count Stock Accurately
- Estimate Weight of Stock
- Estimate Time to Take Inventory
- Calculate Space Needed for Stock
- Calculate Shipping Costs and Time

Now it's your turn. Try these activities to practice the math tasks you may need to perform in your job. See Check My Answers at the end of the section for the correct answers.

If you have trouble with any of these activities, review the Foundations Math Skills that are used for each task.



## Task 1:

# Read Stock Codes Accurately

Performing this task involves the following skill:

- Reading accurately

### ► Level 1

To build your reading accuracy, practise with the following exercises.

Match the correct item from the list on the right to the item shown on the left.

- |               |   |
|---------------|---|
| 1.1 34AC7     | a) 43AC7<br>b) 34AC7<br>c) 34HC7<br>d) 304A7                |
| 1.2 40953-8Q  | a) 40935-80<br>b) 40953-8Q<br>c) 40395-AQ<br>d) 49035-HQ    |
| 1.3 4829LP-1  | a) 4829LP-11<br>b) 4829LP-1<br>c) 4829LP-L<br>d) 4829PL-11  |
| 1.4 xy038.4.3 | a) xy308.4.3<br>b) xy038.43<br>c) xy038.403<br>d) xy038.4.3 |
| 1.5 67AC5-3   | a) 67AC5-35<br>b) 67AD5-3<br>c) 67AC5-3<br>d) 76AC5-3       |
| 1.6 4//05#I   | a) 4///05#I<br>b) 4//505#I<br>c) 4//05#I<br>d) 4//50#1      |
| 1.7 @3>>?1    | a) a3>>?1<br>b) @3<<?1<br>c) @3->>?I<br>d) @3>>?1           |

- 1.8 a.m.3c:R      a) a,m,3c:R  
                          b) a.m.3c:R  
                          c) a.n.3C:R  
                          d) a.m.-3C:R
- 1.9 xrq0=74z      a) xrgo-74-z  
                          b) xrq0=74z  
                          c) xrg0—74z  
                          d) xgro=74z
- 1.10 358116-m      a) 358116-m  
                          b) 3581116-m  
                          c) 358161-m  
                          d) 356118—m
- 1.11 18941 10439      a) 19841 14039  
                          b) 18941-10439  
                          c) 18941 14039  
                          d) 18941 10439
- 1.12 781894-358      a) 781894-358  
                          b) 781984-358  
                          c) 781894 -- 358  
                          d) 718984-358
- 1.13 14ea16ga.104/w      a) 14ea16aga.14/w  
                          b) 14ea16ga.104/w  
                          c) 14ea116ga/104/w  
                          d) 14ea.16ga.104/W
- 1.14 ;,!!#/>      a) ;,!!#<  
                          b) ;,!!,#/>  
                          c) ;,!!#/>  
                          d) ;,!!#/<
- 1.15 “/”?”My.038      a) ‘/’?”My.038  
                          b) “/”?”My.038  
                          c) “/”?”My.038  
                          d) “?”?”My.038
- 1.16 tuo.etixL      a) tou.etixL  
                          b) tou-etixL  
                          c) tuo.etixL  
                          d) tuo.etixl

- 1.17 MLC83059      a) MLC83059  
                              b) MLC\_83059  
                              c) MLC80359  
                              d) MLC08359
- 1.18 aCgrqY-0      a) aCgrqY-0  
                              b) aCqrgY-0  
                              c) aCrgqY-0  
                              d) acgrY—0
- 1.19 m4xp.5cm      a) m4xp5cm  
                              b) m.4xp.5cm  
                              c) m4px5.cm  
                              d) m4xp.5cm
- 1.20 135909-ac      a) 139909-ac  
                              b) 135909-ac  
                              c) 139509-ac  
                              d) 135090-ac

## Task 2: Count Stock Accurately

Performing this task involves the following types of math:

- Integers (Algebra)
- Estimation Strategies
- Fractions

### ► Level 1

- 2.1 a) On January 4, you counted 112 boxes of COW moist towelettes #6759 in stock. During the month of January, another 21 boxes were received. How many boxes are now in stock?  
b) The food services department has ordered 40 boxes of this item. How many boxes will be left after you fill this order?
- 2.2 You are counting inventory in a particular area of the warehouse. There are three stacks of boxes. Each stack is made up of five boxes. How many boxes are there altogether?

## ► Level 2

- 2.3 Stock item #5867 (26" × 36" garbage bags) was counted at the beginning of April, 2005, and there were 23 cases. Following that, in April, 25 cases were received, 13 cases were shipped, 12 cases were received, 32 cases were shipped, and 28 cases were received. How many cases should be in stock at the end of April?
- 2.4 Housekeeping/grounds have placed an order for 65 cases of these garbage bags to be filled right away. There should always be 12 cases in stock. Estimate and then calculate how many cases you need to order to fulfil these conditions.
- 2.5 You are counting the total cases of a stock item. Each full stack is made up of eight layers of cartons. Each layer is made up of 12 cases. After some searching, you have found full and partial stacks: (approximately)  $\frac{1}{3}$  of a stack in one location,  $3\frac{1}{4}$  stacks in a second location and  $2\frac{1}{2}$  stacks in a third location. Approximately how many stacks in total have you found? What is the total number of cases in stock?
- 2.6 On April 25, 2005, the supervisor asked you to do a blind count of the items listed below. The number of pieces of each item you found is shown in the third column. On April 27, an order for 25 boxes of envelopes and 12 cases of five-cent coin wraps was filled. Later that day, the supervisor pointed out that your count and the inventory printout of these items don't agree. How can you explain the discrepancy? How much of each item should now be in stock?

| Item Description         | Stock No. | No. in stock |
|--------------------------|-----------|--------------|
| #10 business envelopes   | 6376      | 57 boxes     |
| ZZZ 5-cent coin wraps    | 7134      | 24 cases     |
| Large blue BINGO dabbers | 6262      | 9 cases      |

- 2.7 Stock item #8799-b (glass cleaner) was counted on Friday, July 15. There were eight cases in stock. On July 18, the housekeeping supervisor ordered six cases from stock, and asked you to process an order of eight more cases from the supplier. Delivery time for this item is three weeks. How many cases of this item do you expect to have in stock at the end of July?
- 2.8 On July 18, the maintenance supervisor orders the following office supplies from stock: ten packages of printer paper, three boxes of #10 business envelopes, two boxes of self-adhering address labels, four

boxes of Standard staples (chisel point, 5000/box). As you process this order you notice that some items are in short supply, so you can only partially fill the order. You send six packages of printer paper, three boxes of envelopes, one box of labels and two boxes of Standard staples. After filling the order, there are only three of each item left in stock. How many were there before you processed the order?

2.9 (Refer to question 2.8.) Each of the items is a high-demand stock item. Warehouse policy requires that there be at least 12 of each item in stock. Delivery time from the supplier is usually within seven days. On July 19, you receive the following orders: *Finance* needs four boxes of envelopes; *Security* needs two boxes of envelopes and two boxes of staples; *Food Services* needs five packages of printer paper. You send each department part of their order so that you still have one of each item in stock. What do you send each department?

2.10 You process an order to the supplier straight away for the following: 12 cases of printer paper (24 packages per case), 50 boxes of envelopes, 45 boxes of staples and three cases of labels (40 boxes per case). The order is delivered promptly, and you fill the outstanding portion of the orders you received from *Finance*, *Security* and *Food Services*. How many of each item do you now have in stock?

2.11 Use the information below to answer questions a – b.

During a physical inventory, you count the total cases in stock of a particular item. You find 27 cases in one location and a full stack (12 cases per layer, five layers in a stack) in a second location. Later you receive an order of 48 cases of this item.

- a) How many full stacks do you now have in stock?
- b) How many individual cases in addition to the full stacks? What fraction of a full stack is this?

## Task 3:

### Estimate Weight of Stock

Performing this task involves the following types of math:

- Estimation Strategies
- Metric and Imperial Systems

#### ► Level 1

3.1 Estimate the weight of each of the following items (in lb. and in kg):

- a) a stacking chrome upholstered chair (#7168 CRC Slot Chair)
- b) a package of photocopy paper (see #6402)
- c) a case of photocopy paper #6402 (8 ½" × 11" copy paper)
- d) a case of roll paper for adding machine or cash register (#7292 Thermal debit TITO rolls)
- e) a 4' × 8' sheet of one-half inch plywood
- f) a conference table, 36" wide by 72" long (#6812 36" × 72" grey banquet table)
- g) a box of ceramic tiles (#6200 2" × 2" dark blue ceramic tile)
- h) five gallons of paint
- i) a four-drawer filing cabinet (#5950)
- j) one case large blue BINGO dabbers (#6262)

## Task 4:

### Estimate Time to Take Inventory

Performing this task involves the following types of math:

- Estimation Strategies

#### ► Level 1

- 4.1
- a) John has to count all of the inventory in a specific area within his eight-hour shift on Monday. There are 120 different items on his list. What is the average length of time that he can spend on each item?
  - b) About how many items should John have counted after four hours?

## Task 5:

### Calculate Space Needed for Stock

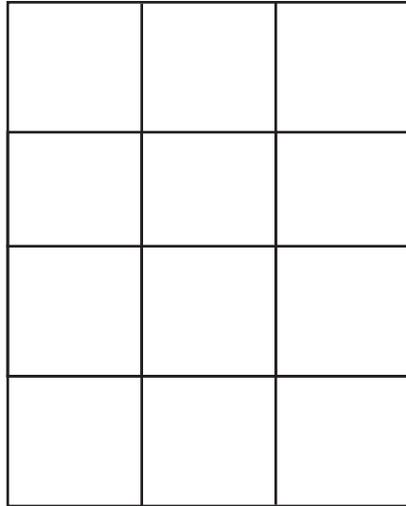
Performing this task involves the following types of math:

- Geometry

#### ► Level 1

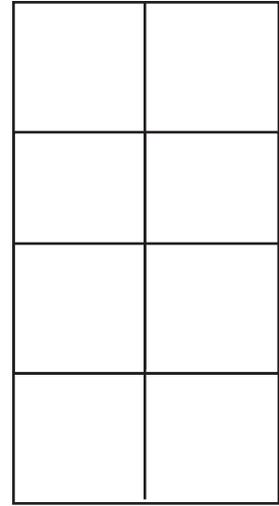
- 5.1 You have to count a large stack of cases. The diagram below shows how they are stacked.
- a) How many cases are there in one layer? How many cases are there in one stack?

*Front view of stack*



Three cases across  
Four cases high  
*Front view*

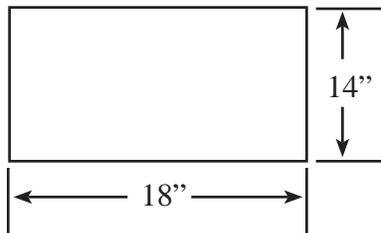
*Side view*



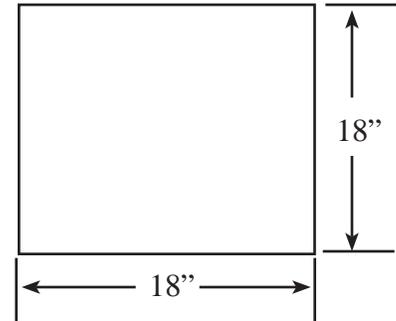
Two cases deep  
*Side View*

- b) Create a bird's-eye view diagram of this stack of cases.
- c) Each case in the diagram above has the dimensions shown below.  
How much space will be needed for a full stack of these cases?

(Front view)



(Top View)



## Task 6:

# Calculate Shipping Costs and Time

Performing this task involves the following types of math:

- Integers (Algebra)
- Decimals
- Rate
- Metric and Imperial Systems
- Geometry

### ► Level 2

6.1 Use the information below to answer questions a – b.

You have to fill an order for rush delivery as follows:

- 10 cases of item “A” at 45 lb. per case
- 12 cases of item “B” at 12.5 kg per case
- 6 cases of item “C” at 15 lb. per case
- 18 cases of item “D” at 20.8 kg per case

The order is being shipped a distance of 16.5 km. The cost of shipping is \$25.00 for loading and unloading, and \$0.075 per kg per kilometre for transport.

- What is the total weight of this order in kg?
- What will be the cost to ship this order?

6.2 Use the information below to answer questions a - c.

The following items are to be shipped by courier:

- Item #1 3 cases at 10 lb. per case
- Item #2 8 cases at 9.0 kg per case
- Item #3 12 cases at 3.5 kg per case
- Item #4 12 cases at 22 lb. per case

The cost of shipping is \$0.065 per lb. per mile. Cost of loading and unloading is \$32.50 per order shipped. The order will be shipped 15.5 km across the city. When it arrives, it will be unloaded, and a second order will be loaded and shipped to a location 21.6 km away where it will be unloaded. The second order is as follows:

- Item #1 12 cases at 10 lb. per case
- Item #2 40 cases at 9.0 kg per case
- Item #3 24 cases at 3.5 kg per case
- Item #4 10 cases at 22 lb. per case

- a) What is the total weight of the first order in pounds? What is the total weight of the second order in pounds?
- b) What is the total distance to be shipped in miles?
- c) Calculate the total cost of shipping these two orders.

### ► Level 3

- 6.3 Use the information below to answer questions a – d.

One of the casinos is having a special event. Its staging involves four large glass pyramids: each 6'6" high on a base 30" square. 3" thick sheets of dense styrofoam will line each crate. The courier company will pack the pyramids, and there will be no charge for the weight of the styrofoam. These pyramids are very expensive, and you have been given the responsibility to have them shipped from the supplier to the Triple Z Casino stage, a distance of 27.3 km.

The cost of shipping is based on either volume or weight. The customer can choose the cheaper option. By volume, the cost of shipping is \$0.025 per cubic foot per kilometre. By weight, the cost is \$0.009 per kg per kilometre. You decide that rather than load and unload the crates yourself and risk an accident, you will pay \$35.00, including insurance, for the courier to load and unload them.

- a) What are the dimensions of the cartons that will be needed to pack these pyramids?
- b) Calculate the volume of styrofoam chips that you will need to pack around the pyramids so that they are snug during shipment.
- c) Solid glass weighs approximately 48 lb. per cubic foot. Calculate the weight of the four pyramids. Round your answer up to the nearest whole number divisible by 10.
- d) Calculate both shipping costs, and select the cheaper option.

- 6.4 Use the information below to answer questions a – d.

You are responsible for shipping equipment from suppliers to various Triple Z locations. You have ordered four hot water tanks. They are glass-lined, and thus rather fragile. They must be crated, and shipped in an upright position to a location 8 miles away.

The tanks each have a radius of 18" and stand 60" high. Each tank weighs 85 lb., and shipping crates in the size range you need weigh 4.8 kg each. The company will crate the tanks. There is no charge for the weight of the styrofoam packing.

Inside the crates, the tanks will stand on a 4"-thick layer of dense styrofoam, and covered with another layer of the same material. There must also be at least 4 inches of space around the tanks that will be densely packed with styrofoam chips.

The cost of shipping is based on either volume or weight to be shipped. The customer can choose the cheaper option. By volume, the cost of shipping is \$0.025 per cubic foot per kilometre. By weight, the cost is \$0.015 per kg per kilometre. You decide that rather than load and unload the crates yourself and risk an accident, you will pay \$35.00, including insurance, for the courier to load and unload them.

- a) Calculate the dimensions of the crates that you will need to ship the tanks.
- b) Calculate the volume of the styrofoam chips that will be needed for packing per crate, then for all four crates.
- c) How much would it cost for this shipment based on volume?
- d) How much would it cost for this shipment based on weight?



**C**ompare your answers for the activities with the answers below. If you have less than half the answers correct, review the material in the Foundation section and try the activities again.

## Task 1: Read Stock Codes Accurately

### Level 1

|      |   |
|------|---|
| 1.1  | b |
| 1.2  | b |
| 1.3  | b |
| 1.4  | d |
| 1.5  | c |
| 1.6  | c |
| 1.7  | d |
| 1.8  | b |
| 1.9  | b |
| 1.10 | a |
| 1.11 | d |
| 1.12 | a |
| 1.13 | b |
| 1.14 | c |
| 1.15 | c |
| 1.16 | c |
| 1.17 | a |
| 1.18 | a |
| 1.19 | d |
| 1.20 | b |

## Task 2: Count Stock Accurately

### ► Level 1

2.1

- a)  $112 + 21 = 133$
- b)  $133 - 40 = 93$

2.2  $5 \times 3 = 15$

## ► Level 2

2.3  $23 + 25 - 13 + 12 - 32 + 28 = 43$  cases

2.4 12 cases are needed to fill the order, and an additional 12 should be in stock.  
Therefore, 24 cases should be ordered.

2.5  $12 \times 8 = 96$  cartons in a stack.  $(1/3 + 3\frac{1}{4} + 2\frac{1}{2}) \times 96 = \text{approx. } 600$  cases.

2.6 There should be 32 cases of business envelopes, 12 cases of coin wraps and 9 cases of BINGO dabbers. Perhaps the system hasn't processed the order yet.

2.7  $+8 - 6 = 2$ . Delivery won't occur before the end of the month.

2.8 Before processing the order, there were nine packages of printer paper, six boxes of envelopes, four boxes of labels and five boxes of staples.

2.9 Food – two packages of paper (back-ordered three boxes)  
Finance – one box of envelopes (back-ordered three)  
Security – one box of envelopes (back-ordered one) and two boxes of staples

2.10 Paper = 287 packages  
Envelopes = 47 boxes  
Staples = 46 boxes  
Labels = 121 boxes

2.11  
a)  $27 + 60 + 48 = 135$  cases = 2 full stacks  
b) 15 individual cases, or  $\frac{1}{4}$  stack

## Task 3: Estimate Weight of Stock

### ► Level 1

3.1 Participants make their own estimates.

## Task 4: Estimate Time to Take Inventory

### ► Level 1

4.1

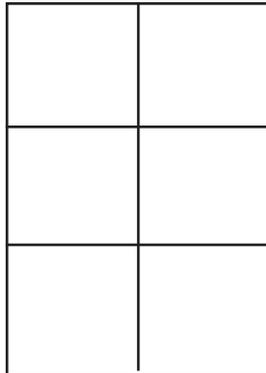
- a)  $8 \text{ hours} \div 120 \text{ items} = 480 \text{ minutes for } 120 \text{ items} = 4 \text{ minutes per item}$
- b) about  $\frac{1}{2}$  or 60

## Task 5: Calculate Space Needed for Stock

### ► Level 1

5.1

- a)  $3 \times 2 = 6 \text{ cases per layer} \times 4 \text{ cases high} = 24 \text{ cases per stack}$
- b)



- c)  $1\frac{1}{2}' \times 3 \text{ cases} = 4\frac{1}{2}''$  plus some air space  
 $1\frac{1}{2}' \times 2 \text{ cases across} = 3'$  plus some air space  
 $14'' \text{ high} \times 4 \text{ in a stack} = 56''$  or  $4'8''$  high plus some air space

## Task 6: Calculate Shipping Costs and Time

### ► Level 2

6.1

- a)  $10 \times 45 + 6 \times 16 = 540 \text{ lb.} \div 2.2 = 245.45 \text{ kg.}$   
 $12 \times 12.5 + 18 \times 20.8 = 524.4 \text{ kg.}$   
**Total = 769.85 kg**
- b)  $\$25.00 + (769.85 \text{ kg} \times 0.075/\text{kg} \times 16.5 \text{ km}) = \$977.68$

6.2

- a) First load = 544.80 lb.  
Second load = 1,316.80 lb.
- b) First trip = 9.69 miles  
Second trip = 13.5 miles
- c) First shipment =  $(9.69 \times \$0.065 \times 544.80) + \$32.50 = \$375.64$   
Second shipment =  $(13.5 \times \$0.065 \times 1,316.80) + \$32.50 = \$1,187.99$

### ► Level 3

6.3

- a) Shipping crates will have to be 36" × 36" × 84" high.
- b) Empty space inside carton =  $30" \times 30" \times 78" = 70,200$  cubic inches.  
Pyramids will take up 1/3 of that space.  
Volume to be filled with chips =  $2/3 \times 70,200$  cubic inches = 46,800 cubic inches, or 27.1 cubic feet per crate.  $27.1 \times 4$  crates = 108.4 cu. ft.
- c) Volume of pyramid =  $1/3 \times (78 \times 30 \times 30) = 23,400$  cu inches = 13.54 cubic feet × 48 = 650 lb. each × 4 pyramids = 2,600 lb.
- d) By volume:  $36 \times 36 \times 84 \times 4 = 435,456$  cubic inches ÷ 1,728 = 252 cubic feet.  
At 0.025 per cubic foot, shipping will cost  $\$35.00 + (252 \times 0.025 \times 27.3) = \$206.99$ .  
By weight:  $2,600 \text{ lb.} \div 2.2 = 1,181.82 \text{ kg} \times 0.009 \times 27.3 + 35.00 = \$325.37$ .  
Shipping by volume is the cheaper option.

6.4

- a) Crates must be 44" × 44" × 68" high.
- b) The volume of packing chips needed is the volume of the crate (not including styrofoam boards) minus the volume of the cylinder.  
 $(44 \times 44 \times 60) - (3.14 \times 18^2 \times 60) = 116,160 - 61,041.60 = 55,118.40$  cubic inches or 31.90 cubic feet per crate; 127.00 cubic feet for the whole shipment
- c) Cost of shipping by volume =  $(76.19 \times 4 \times \$0.025 \times 12.8 \text{ km}) + \$35.00 = \$132.52$ .
- d) Cost of shipping by weight =  $4(38.64 + 4.8) = (173.76 \times \$0.015 \times 12.8) + \$35.00 = \$68.36$   
Shipping by weight is the cheaper option in this case.