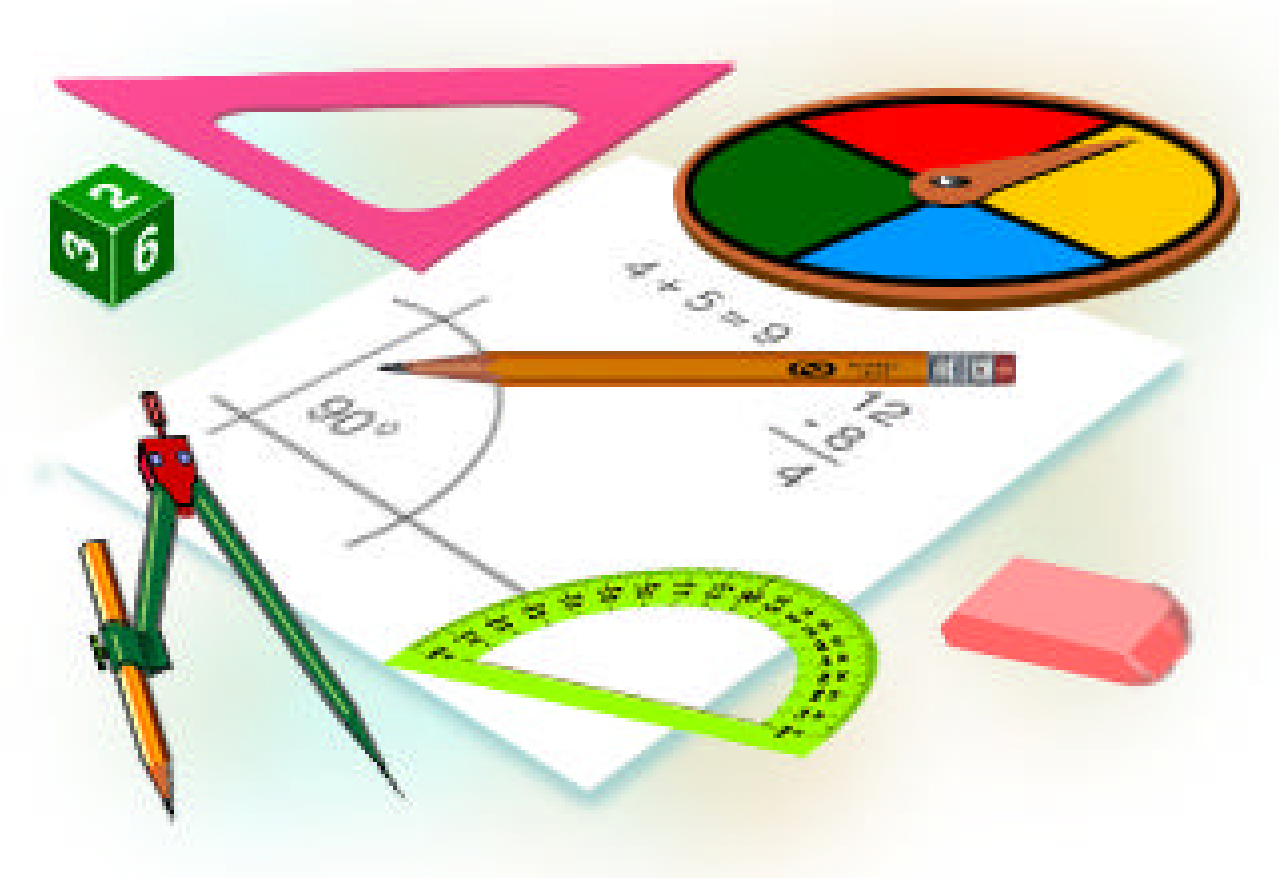
The Next Step

Mathematics Applications for Adults



Book 14015 - Measurement

OUTLINE

Mathematics - Book 14015

Measurement
Time
Money
find unit cost.
Charts and Graphs (bar, line, pictograph)
answer questions about information contained in given graphs.
Metric Measurement
find area of rectangle and square.
find volume of a rectangular prism.
Word Problems with Measurement
solve one/two step problems with addition, subtraction, multiplication and division of whole numbers, decimals, time, money, temperature, and metric measurement.

THE NEXT STEP

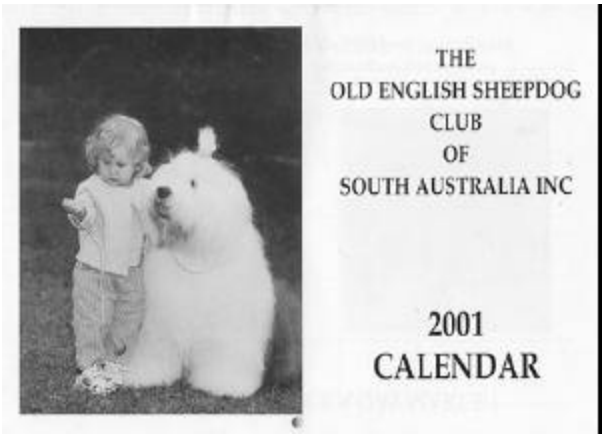
Book 14015

Measurement

Time

A ***day*** is the time it takes earth to spin around once on its *axis*, or twenty-four hours. (The axis is an imaginary pole that runs through the middle of the planet from the North Pole to the South Pole.) Seven days make up one *week*. Twenty-eight to thirty-one days make up one ***month***. A month is the approximate time needed for the moon to revolve once around earth. The lunar month actually takes twenty-nine days, twelve hours, forty-four minutes, and three seconds.

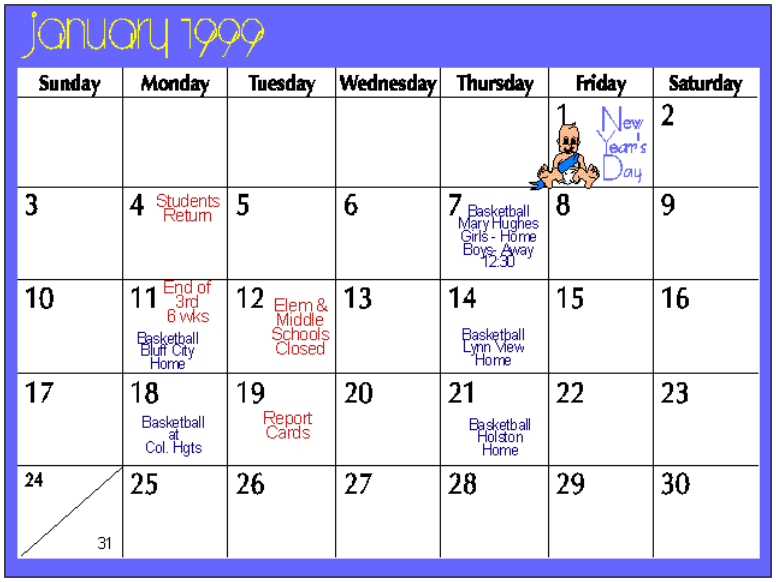
Twelve months make up one ***year***. A year is the time it takes earth to revolve once around the sun, or 365 days, five hours, forty-eight minutes, and forty-six seconds.



Calendars are tools that help us group days into weeks, months, and years. The calendar used throughout the world today is called the ***Gregorian*** calendar.

The astronomer Sosigenes was asked by Julius Caesar to create a calendar for the Roman Empire. The calendar was based on the solar year of 365 days. The year was divided into twelve months. Each month lasted thirty or thirty-one days, with the exception of February, which lasted either twenty-eight or twenty-nine days. The Julian calendar is the basis for the Gregorian calendar that was introduced by Pope Gregory VIII in 1582. The names used for the months in the Roman calendar were used in the Julian calendar. These names are also used today.

Roman	Gregorian	Roman	Gregorian
Januarius	January	Quintilis	July
Februarius	February	Sextilis	August
Martius	March	September	September
Aprilis	April	October	October
Maius	May	November	November
Junius	June	December	December



The names we use for weekdays come from the Saxons of England. The Saxons named the days for the planets and their gods.

SUN'S day .....Sunday
MOON'S day .....Monday
TIW'S day .....Tuesday
WODEN'S day .....Wednesday
THOR'S day.....Thursday
FRIGG'S day .....Friday
SATURN'S day .....Saturday

Sosigenes made a mistake in the Julian calendar, but nobody found the mistake for hundreds of years. He made every fourth year a leap year, but these leap years made the calendar too long to measure the cycle of the sun. By the 1500s, the Julian calendar was almost two weeks ahead of the actual solar year.

Pope Gregory VIII fixed the mistake in 1582. Leap years were now added to the calendar every four years except for the years that begin new centuries, unless the number of the new century can be divided evenly by 400.

The century date 1900 was not a leap year (1900 ¸ 400 = 4 3/4), but the year 2000 was a leap year (2000 ¸ 400 = 5).

Pope Gregory VIII's calendar is accurate to within sixteen seconds per year. That's the reason we still use it today.

⇒ **Remember: 30 days has September**
April, June, and November,
All the rest have 31,
Except February which has 28 days clear
And 29 each leap year.

Numeric Dating

Numeric dating is the way of recording the date with 8 digits.
year: the last two digits 1977 = 77
month: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12
day: number of the day

The three styles are: d/m/y 01/11/95
y/m/d 95/11/01
m/d/y 11/01/95

These are all different ways of writing November 1, 1995.

Numeric dating is usually used when filling in forms.

Remember all the concerns that we had around the year 2000? This was all due to the fact that we were using numeric dating. As the year 2000 was approaching, we had a problem with computers that were reading only the last 2 digits of the year. If the computers were not 2000 compatible, they were reading 2001 as 1901 or 2021 as 1921.

Express the following with numeric dating using y/m/d.

1) June 12, 2002
2) January 7, 1939
3) April 26, 1961
4) August 18, 1980
5) Today's date

Schedule

A table that lists activities and the times they happen

Example:

FLIGHTS FROM MIAMI TO NEW YORK CITY	
Each flight lasts about 2 hours and 45 minutes.	
Airline	**Departure Time**
Airline A	9:10 A.M.
Airline B	10:15 A.M.
Airline C	12:50 P.M.
Airline D	1:20 P.M.

We divide ***days*** into 24 ***hours***, but hours are divided into ***60*** parts. Roman astronomers called each division a ***par minuta*** or "small part of an hour." From the Latin name comes our word ***minute***. These early astronomers also divided minutes into *60* equal parts. They called each division ***par seconda***, or ***second***.

Measures of Time

60 seconds (sec) = 1 minute (min)
60 minutes = 1 hour (hr)
24 hours = 1 day
7 days = 1 week (wk)

12 months (mo), or 52 weeks, or 365 days = 1 year (yr)
366 days = 1 leap year

Write in minutes.

1. 2 h 40 min
2. 1 h 55 min
3. 3 h 30 min
4. 5 h
5. 3 h 15 min

Answer the following.

1. 1 week 3 days = _____ days
2. 23 days = _____ weeks _____ days
3. 15 months = _____ year _____ months
4. 2 weeks 1 day = _____ days
5. 18 months = _____ year _____ months

Standard time means the measurement of the day in two blocks of twelve hours each. The twelve hours from midnight to just before noon are ***a.m.*** hours. The twelve hours from noon until just before midnight are ***p.m.*** hours. The abbreviations "a.m." and "p.m." come from the Latin for ***ante meridiem*** and ***post meridiem***, meaning ***before*** (ante) and ***after*** (post) midday or noon (***meridiem***).

Today many clocks and watches use the battery-powered vibrations of a quartz crystal to keep time. The natural vibration of a quartz crystal is 100,000 times per second. Modern clocks and watches show the time in digital as well as analog displays.

Digital

Analog

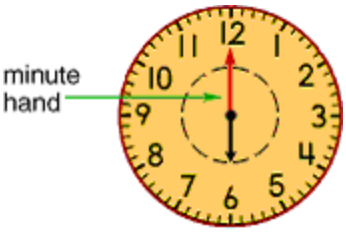
How to Tell Time

This clock demonstrates how minutes are to be read on an analog clock face. We know that there are 60 minutes in one hour, so the minute hand indicates the number of minutes that we are to read. In the picture on page 113, the minute hand (the longer red hand) is pointing at the 2 which stands for 10 minutes. The hour hand (the shorter blue hand) is pointing at the 9. We can read the time as "10 minutes after 9", "10 minutes past 9", or "9:10". You could even say that it is "50 minutes before 10", because it will take another 50 minutes before the hour hand points at the 10.

To figure out the minutes on a clock face, you must skip count by fives. For example, the 1 represents 5 minutes, the 2 represents 10 minutes, the 3 represents 15 minutes…and so on.

Hour Hand

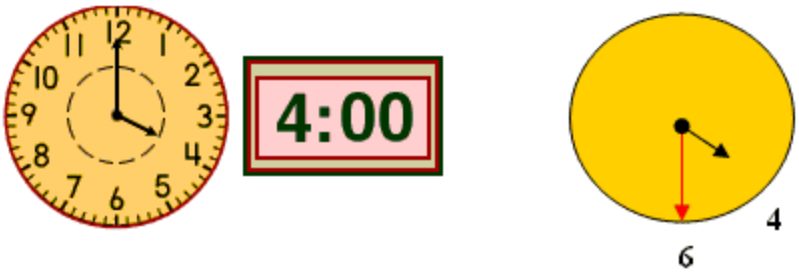
Minute Hand



O'clock

The clock shows 1 **o'clock**

Half Hour



A **half hour** is 30 minutes, so when the **minute hand** reaches the six and the hour hand remains on four, the new time will be **4:30.**

Practice Exercise

Fill in the blanks.

1.  The time is _____ minutes past 11.

2.  30 minutes later, the time will be _____.

3.  2 hours later, the time will be _____

4.  15 minutes earlier, the time was _____.

Digital time is read from left to right. The first number stands for hours and the second number, after the colon, stands for minutes.

The clock above reads “10:20”. That means 10 hours and 20 minutes. You will also notice that the numbers are proceeded by the letters “P.M.” which tells us that this clock is reading “10:20 in the evening”, “20 minutes after 10”, “20 minutes past 10”, “40 minutes before 11”, or “40 minutes to 1”.

Military Time

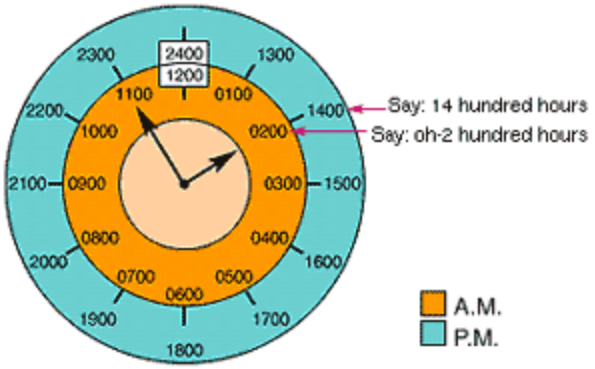
Standard time can be confusing. For example, eight o’clock can mean eight in the morning or eight in the evening. To avoid confusion, scientists created a 24-hour clock. The hours are numbered ***1*** through ***24***, beginning at midnight. This way of counting the hours in a day is called ***military time***. People who use military time say the time in a special way. For example, 11:00 is not called “eleven o’clock,” but “eleven hundred hours.”

Standard Time	24-Hour Time	Military Time
12:01 midnight	00:00	0001 hours
1:00 am	01:00	0100 hours
2:00 am	02:00	0200 hours
3:00 am	03:00	0300 hours
4:00 am	04:00	0400 hours
5:00 am	05:00	0500 hours
6:00 am	06:00	0600 hours
7:00 am	07:00	0700 hours
8:00 am	08:00	0800 hours
9:00 am	09:00	0900 hours
10:00 am	10:00	1000 hours
11:00 am	11:00	1100 hours
12:00 noon	12:00	1200 hours
1:00 pm	13:00	1300 hours
2:00 pm	14:00	1400 hours
3:00 pm	15:00	1500 hours
4:00 pm	16:00	1600 hours
5:00 pm	17:00	1700 hours
6:00 pm	18:00	1800 hours
7:00 pm	19:00	1900 hours
8:00 pm	20:00	2000 hours
9:00 pm	21:00	2100 hours
10:00 pm	22:00	2200 hours
11:00 pm	23:00	2300 hours
12:00 midnight	24:00	2400 hours

24-Hour Clock

A clock that does not use A.M. or P.M.

Example:



Money

The word ***dollar*** comes from the German word for a large silver coin, the ***Thaler***. In 1781, ***cent*** was suggested as a name for the smallest division of the dollar. Thomas Jefferson, third President of the United States and an amateur scientist, thought that the dollar should be divided into 100 parts. The word ***cent*** comes from the Latin ***centum***, which means one hundred.

Canadian currency was first proposed in 1850, but the first coins were not released for circulation until December 12, 1858.

1 penny = 1 cent (¢)
1 nickel = 5 cents
1 dime = 10 cents

1 quarter = 25 cents

1 dollar ($) = 100 cents

Penny (Cent)

Nickel

Dime

Quarter

Dollar (Loonie)

Toonie

Canadian money is created in decimal-based currency. That means we can add, subtract, divide, and multiply money the same way we do any decimal numbers.

The basic unit of Canadian currency is the “loonie” or dollar. The dollar has the value of one on a place value chart. The decimal point separates dollars from cents, which are counted as tenths and hundredths in a place value chart.

$1.11	**ones = dollars**	**.**	**tenths = dimes**	**hundredths = pennies**
one cent				**1**
ten cents		**.**	**1**	**0**
one dollar	**1**	**.**	**0**	**0**

$4.63	**ones = dollars**	**.**	**tenths = dimes**	**hundredths = pennies**
three cents				**3**
sixty cents		**.**	**6**	**0**
four dollars	**4**	**.**	**0**	**0**

$1.11 = $1.00 + 10Ë + 1Ë is read as 1 dollar and 11 cents
$4.63 = $4.00 + 60Ë + 3Ë is read as 4 dollars and 63 cents

When you write down amounts of money using the dollar sign, ***$***, you write the amounts the same way as you write decimal numbers—in decimal notation. There is a separate cents sign, ***Ë***. The cents sign does not use decimal notation. So if you have to add cents to dollars, you have to change cents to dollar notation.

8Ë = $.08

36Ë = $.36

100Ë = $1.00

Fill in the blank.

1. **298** cents equals _____ quarters, _____ dimes, _____ nickel, _____ pennies, _____ dollars.
2. 4 quarters equals _____ cents.
3. 5 nickels, 5 quarters, 1 penny, 2 dollars, 2 dimes equals _____ cents.
4. **102** cents equals _____ quarters, _____ dimes, _____ pennies.
5. 5 dimes equals _____ cents.
6. 1 penny, 4 nickels, 4 dimes, 1 quarter, 3 dollars equals _____ cents.

7. **599** cents equals _____ dimes, _____ dollars, _____ nickel, _____ quarters, _____ pennies.
8. 5 dollars equals _____ cents.
9. 1 penny, 3 nickels, 2 dimes equals _____ cents.
10. 5 dollars, 4 quarters, 1 nickel equals _____ cents.
11. 9 dimes equals _____ cents.
12. **71** cents equals _____ quarter, _____ dimes, _____ penny, _____ nickels.
13. 1 penny, 2 dimes, 2 quarters, 2 nickels, 4 dollars equals _____ cents.
14. **568** cents equals _____ dimes, _____ dollars, _____ quarter, _____ pennies.
15. 8 nickels equals _____ cents.
16. 4 pennies, 4 nickels, 2 dimes, 5 quarters equals _____ cents.
17. **280** cents equals _____ dimes, _____ quarters, _____ nickel, _____ pennies, _____ dollars.
18. 3 dollars equals _____ cents.
19. 3 nickels, 5 dimes equals _____ cents.
20. **225** cents equals _____ quarter, _____ dollars.
21. 1 dime, 2 pennies equals _____ cents.
22. **45** cents equals _____ dime, _____ quarter, _____ pennies, _____ nickel

Solve for each of the given problems.

(1) $39.89 + 70.79

(2) $45.79 + 67.67

(3) $13.07 + 64.28

(4) $71.64 + 17.89

(5) $24.49 + 35.49

(6) $990.22 + 421.89

(7) $376.08 + 234.21

(8) $918.89 + 827.39

(9) $719.12 + 670.97

(10) $25.57 − 19.96

(11) $88.46 − 79.65

(12) $75.26 − 65.64

(13) $92.8 − 37.50

(14) $100.23 − 100.02

(15) $618.93 − 132.94

(16) $419.08 − 169.72

(17) $285.06 − 106.31

(18) $69.62 × 2

(19) $24.91 × 3

(20) $82.92 × 4

(21) $45.79 × 4

(22) $22.17 × 2

(23) $94.03 × 2

(24) $51.18 × 6

(25) $75.05 × 9

(26) $30.16 ÷ 8

(27) $41.85 ÷ 9

(28) $65.44 ÷ 8

(29) $96.96 ÷ 8

(30) $58.65 ÷ 3

(31) $69.44 ÷ 7

Unit Pricing

Family members are consumers as well as workers. They spend a considerable amount of money to purchase food and other items that they need or desire. To obtain the maximum value for their money it is important to shop wisely. One way to stretch a dollar in the supermarket is to compare *unit prices* of items. A unit price is the amount charged for a single unit of measure such as one ounce or one pound. The unit price of an item is frequently printed on a price label along with the total cost of the item. If two items are of the same quality, it is worthwhile to buy the item that is a cent or two less per unit. Small savings repeated many times add up to big savings. The following formula may be used to compute the unit price of an item:

Unit Price = (Price of Item) ÷ (Weight of Item)

Example 1: If a ten pound bag of potatoes costs $1.25, what is the price per pound of the potatoes?

Solution: Price per pound $1.25 ÷ 10 = $.125

The unit price is approximately 13 cents per lb.

Example 2: Is it better to buy a 2 pound jar of jelly for $1.18 or a 3 pound jar of the same jelly for $1.68?

Solution:

$1.18 ÷ 2 = $.59 per pound
$1.68 ÷ 3 = $.56 per pound
The 3 pound jar for $1.68 is the better buy.

Practice Exercise

Which is the better buy:

1. 10 oranges for 85¢ or 12 oranges for 99¢
2. 5 pears for 49¢ or 2 pears for 25¢
3. 4 apples for 39¢ or 10 apples for 89¢
4. 12 doughnuts for $1.89 or 2 doughnuts for 49¢
5. 5 1bs. of grass seed for $6.50 or 25 lbs. of grass seed for $27.75.
6. 7 cans of soup for $2 or 3 cans of soup for 95¢
7. 6 rolls for 59¢ or 12 rolls for 99¢

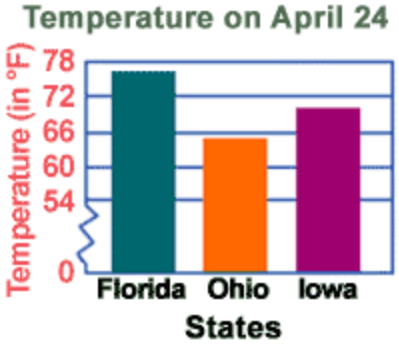
Charts and Graphs

A ***graph*** is a kind of drawing or diagram that shows ***data***, or information, usually in numbers. In order to make a graph, you must first have data.

Bar Graph

A graph that uses separate bars (rectangles) of different heights (lengths) to show and compare data

Example:

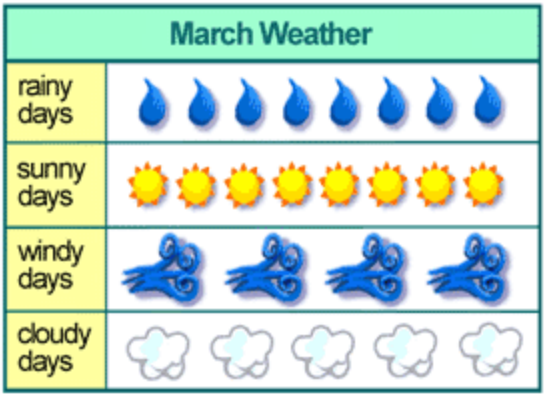


Line Graph

A graph in which line segments are used to show changes over time

Example:

Pictographs (picture graphs) are graphs that use pictures called ***icons*** to display data. Pictographs are used to show data in a small space. Pictographs, like bar graphs, compare data. Because pictographs use icons, however, they also include keys, or definitions of the icons.



Practice Exercise

Answer the following.

1. The graph on this page shows the number of books read by each student. Each ball represents 2 books.

Susan	Kimberly	Linda	Mandy

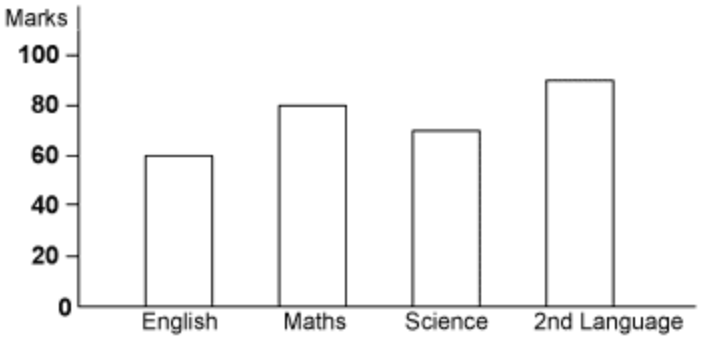
(a) Who read the most books?

(b) How many books did Linda read?

(c) How many books did all the children read?

(d) How many books did Susan read?

2. This graph shows the examination results of Larry.



(a) How many marks did he score in Maths?

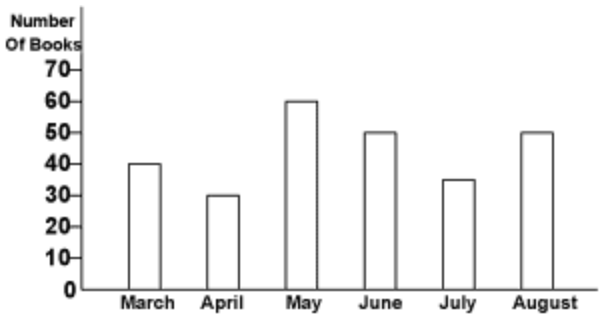
(b) Which subject had the lowest score?

(c) How many more marks did he score in Maths than Science?

(d) How many marks did he score in 2nd language?

(e) What was his total marks for all 4 subjects?

3. This graph shows the number of books sold in 6 months.



(a) Which month had the highest sale?

(b) How many books were sold in March?

(c) How many more books were sold in June than July?

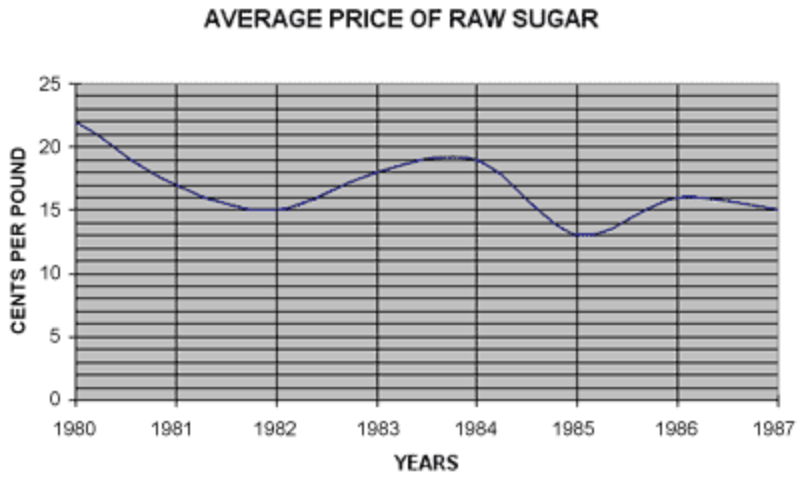
(d) How many books were sold in August?

(e) Which month had the lowest sale?

(f) What was the total number of books sold in April and May?

(g) What was the total number of books sold in July and August?

The following graph shows the rise and fall of sugar prices.



1. The graph shows the average price of _____ sugar.

2. The graph measures the price of sugar in _____ per _____.

3. The graph shows the rise and fall of raw sugar prices from _____ to _____.

Decide whether each statement is true or false.

4. In 1986, 100 pounds of sugar would have cost $1600.

True False

5. Between 1982 and 1984, raw sugar prices rose.

True False

6. The biggest decrease in raw sugar prices in one year took place between 1980 and 1981.

True False

Answer the following.

7. The difference in price between a pound of sugar in 1985 and a pound of sugar in 1986 was _____.

8. The difference between the highest and the lowest raw sugar prices shown on the graph is _____ per pound.

Metric Measurement

In the 1790s, French scientists worked out a system of measurement based on the ***meter***. The meter is one ten-millionth of the distance between the North Pole and the Equator. The French scientists made a metal rod equal to the length of the standard meter.

By the 1980s, the French metal bar was no longer a precise measure for the meter. Scientists figured out a new standard for the meter. They made it equal to 1/299,792,548 of the distance light travels in a vacuum in one second. Since the speed of light in a vacuum never changes, the distance of the meter will not change.

The French scientists developed the ***metric*** system to cover measurement of length, area, volume, and weight.

Metric Length Equivalents

Metric Unit	Abbreviation	Metric Equivalent
millimeter	mm	.1 centimeter
centimeter	cm	10 millimeters
decimeter	dm	10 centimeters
meter	m	100 centimeters
decameter	dam	10 meters
hectometer	hm	100 meters
kilometer	km	1000 meters

Metric Weight Equivalents

Metric Unit	Abbreviation	Metric Equivalent
milligram	mg	.001 gram
centigram	cg	10 milligrams
decigram	dg	10 centigrams
gram	g	1,000 milligrams
decagram	dag	10 grams
hectogram	hg	100 grams
kilogram	kg	1,000 grams

Metric Volume Measures

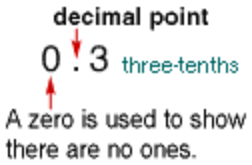
Metric Unit	Abbreviation	Metric Equivalent
milliliter	ml	.001 liter
centiliter	cl	10 milliliters
deciliter	dl	10 centiliters
liter	l	1,000 milliliters

decaliter	dal	10 liters
hectoliter	hl	100 liters
kiloliter	kl	1,000 liters

Decimal Point

A period that separates the whole numbers from the fractional part of a number; or that separates dollars from cents

Example:



Kilometers Hectometers Decameters Meters Decimeters Centimeters Millimeters

Kilograms Hectograms Decagrams Grams Decigrams Centigrams Milligrams

Kiloliters Hectoliters Decaliters Liters Deciliters Centiliters Milliliters

To use this chart, if a question asks you how many grams that you can get from 200 centigrams, for example, try this:

Start by putting down the number:

200

If we don't see a decimal point, the number is a whole number; and therefore, a decimal point may be inserted to the right of the last digit:

200.

Now, using your chart, start at centigrams and count back to grams (two spaces to the left).

Move the decimal point in your number the same amount of spaces in the same direction:

2.00

The answer to the question is that 200 centigrams is equal to 2 grams.

If a question asks you to tell how many millimeters are in 8.3 decimeters, try this:

Write down the number:

8.3

We already see a decimal point, so there is no need to guess where to place it:

8.3

Now, using your chart, start at decimeters and count forward to millimeters (two spaces to the right).

Move the decimal point in your number the same amount of spaces in the same direction:

830.

The answer to the question is that 830 millimeters is equal to 8.3 decimeters.

Practice Exercise

Fill in the answer.

1. 20 ml = _____ cl
2. 7000 g = _____ kg
3. 2 m = _____ cm
4. 2 kl = _____ L
5. 30 ml = _____ cl
6. 8 L = _____ cl
7. 10 ml = _____ cl
8. 5000 g = _____ kg
9. 80 mm = _____ cm
10. 500 cg = _____ g
11. 5 cl = _____ ml
12. 1 kl = _____ L
13. 6 g = _____ cg
14. 10 g = _____ mg
15. 400 cl = _____ L
16. 7000 mg = _____ g
17. 8 km = _____ m
18. 900 cg = _____ g
19. 11000 ml = _____ L
20. 1 g = _____ cg
21. 3000 g = _____ kg

22. 7 cm = _____ mm

23. 9 kg = _____ g

24. 300 cl = _____ L

25. 10 kl = _____ L

26. 11 cl = _____ ml

27. 4 kl = _____ L

28. 120 mg = _____ cg

29. 11000 L = _____ kl

30. 4 cl = _____ ml

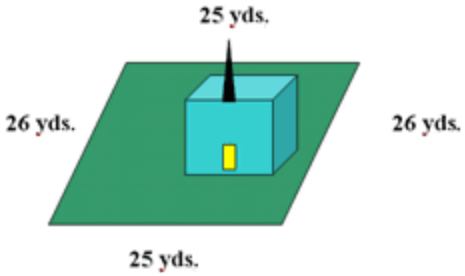
31. 6 kg = _____ g

32. 1200 cm = _____ m

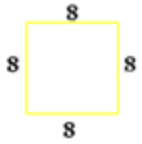
33. 12 kl = _____ L

Calculating Perimeter

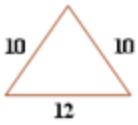
Perimeter is calculated in different ways, depending upon the shape of the surface. The perimeter of a surface outlined by straight lines is calculated by adding together the lengths of its sides.



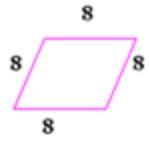
25 + 26 + 25 + 26 = 102 yds. perimeter of the rectangular lot



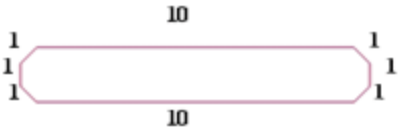
8 + 8 + 8 + 8 = 4 x 8 = 32
4s (4 sides) = perimeter of a square



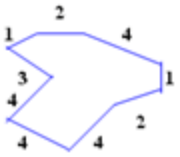
10 + 10 + 12 = 32
3s (3 sides) = perimeter of a triangle



8 + 8 + 8 + 8 = 4 x 8 = 32
4s = perimeter of a rhombus



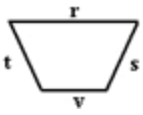
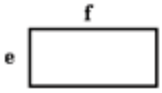
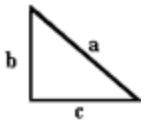
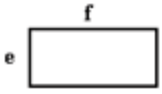
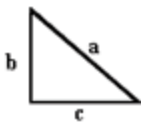
1 + 1 + 10 + 1 + 1 + 1 + 10 + 1 = 26
8s = perimeter of an irregular octagon



4 + 1 + 2 + 4 + 4 + 4 + 3 + 1 + 2 = 25
all sides = perimeter of an irregular polygon

Practice Exercise

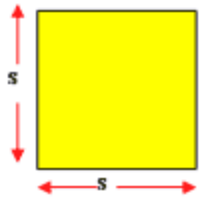
Find the perimeter.

1.  m = 22 m All sides are equal **132 m**	2.  All sides are equal 11 mi _____
3.  v = 5 m t = 9 m r = 14 m s = t _____	4.  e = 7 m f = 10 m _____
5.  a = 8 m c = 3 m b = c _____	6.  The side d of this square is 38 m _____
7.  m = 15 ft All sides are equal _____	8.  e = 8 yd f = 13 yd _____
9.  The side d of this square is 27 yd _____	10.  a = 5 cm c = 2 cm b = c _____

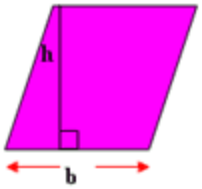
Calculating Area

Area is calculated in different ways, depending on the shape of the surface. Area is expressed in squares: square inches, square meters, etc.

An area with a perimeter made up of straight lines is calculated in different ways for different shapes.



S ² = area of a square



base x height = area of a rhombus

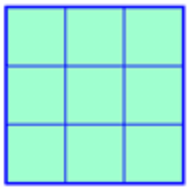
b x h = area of a rectangle

The area of a rectangle, square, or rhombus is sometimes referred to as length x width (l x w) instead of base x height.

Area

The number of square units needed to cover a given surface

Example:



The area is 9 square units.

Square Unit

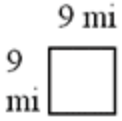
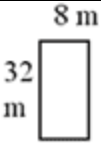
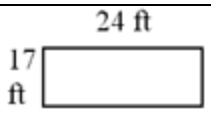
The unit used to measure area

Example:

1 square unit

Practice Exercise

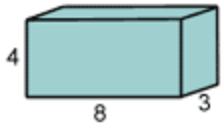
Find the area for each.

1.		**81 square miles**
2.		_____
3.		All sides are 12 cm _____
4.		_____
5.		All sides are 19 ft _____

Calculating Volume

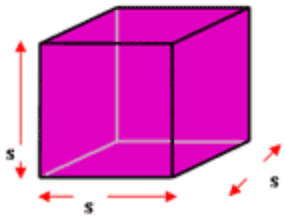
Volume is the amount of space contained in a three-dimensional shape. Area is a measurement of only ***two*** dimensions, usually length and width. Volume is a measurement of ***three*** dimensions, usually ***length***, ***width***, and ***height***, and is measured in cubic units.

To find the volume of a ***cube*** or a ***rectangular prism***, multiply length by width by height.



l x w x h = volume of a rectangular prism
8 x 3 x 4 = 96

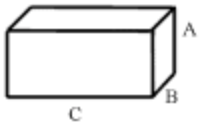
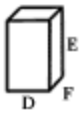
Since a cube has sides of equal length, multiply the length of one side by itself three times, S^3:



S^3 = volume of a cube

Practice Exercise

Find the volume.

1.  A = 9 ft B = 5 ft C = 20 ft _____	2.  All sides are 9 mm _____
3.  A = 15 yd B = 4 yd C = 32 yd _____	4.  D = 24 mm E = 36 mm F = 4 mm _____

Fill in the missing spaces and complete the table.

	length	*width*	*height*	*volume*
5.	13 in	14 in	11 in	___ cubic inches
6.	5 cm	7 cm	10 cm	___ cubic centimeters
7.	16 ft	30 ft	8 ft	___ cubic feet
8.	80 cm	60 cm	15 cm	___ cubic centimeters
9.	___ yd	6 yd	12 yd	648 cubic yards
10.	___ mm	10 mm	7 mm	560 cubic millimeters
11.	___ cm	9 cm	3 cm	108 cubic centimeters
12.	7.5 mm	13.4 mm	9.8 mm	___ cubic millimeters
13.	3 ft	9.7 ft	12 ft	___ cubic feet
14.	13 m	15.85 m	11.2 m	___ cubic meters
15.	13.65 cm	16.29 cm	3 cm	___ cubic centimeters

Word Problems with Measurement

1. Jan measured the distance around the picture frame as 180 centimeters. How many meters is that?

2. George said he had just finished jogging 3,500 meters. How many kilometers did he run?

3. The length of a rectangular field is 0.015 kilometers and the width is 25 meters. To build a fence, one of the 0.015-kilometer sides uses 5 equal sections of fencing. How long is each section of fencing?

4. Dietary guidelines say a person on a 2,500-calorie-per-day diet should consume fewer than 24 grams of sodium daily. How many milligrams is that?

5. How many 500-gram packages of rice can you make from a 4-kilogram box of rice?

6. Jim is planning on taking a two-week vacation. How many hours of work will he miss while on his vacation?

7. Sally packages carpentry nails at a factory. She can package 100 nails in a box every 15 seconds. How many minutes will it take her to package 200 nails?

8. A job fair was held on May 9th. The fair was open to the public for 480 minutes. For how many hours was the fair open?

9. Michelle spends 3 hours per week in an English 101 class. How many minutes is she in class each week?

10. Michelle's English class includes a one-hour lab twice a week. How many minutes is she in lab each week?

11. Samuel volunteered as an aide at the nursing home 40 hours last month. Is his volunteer time more or less than 3,000 minutes?

12. The supervisor of a glass-cutting department thought a job should take 15 minutes. Bob figures he can do the job in a quarter hour. Is his time more than, less than, or the same as what the supervisor says is adequate?

13. Elva was asked to put lace around the bottom of a ballerina's skirt. The length around the skirt is 94 mm. The lace comes in 6 cm. packages. Will one package be enough for Elva to use?

14. At an adult education class, Jack spends 6 hours a week working on computer skills. Trevor thinks he spends about 400 minutes a week on his home computer. Who spends more time on a computer?

Answer Key

Book 14015 - Measurement

Page 7 **1.** 02/06/12 **2.** 39/01/07 **3.** 61/04/26 **4.** 80/08/18 **5.** answers will vary

Page 9 **1.** 160 min **2.** 115 min **3.** 210 min **4.** 300 min **5.** 195 min

Page 9 **1.** 10 days **2.** 3 weeks 2 days **3.** 1 year 3 months **4.** 15 days **5.** 1 year 6 months

Page 13 **1.** 30 **2.** 3:30 **3.** 11:30 **4.** 3:45

Page 19 **1.** 2 quarters, 4 dimes, 1 nickel, 3 pennies, 2 dollars **2.** 100 cents **3.** 371 cents **4.** 2 quarters, 5 dimes, 2 pennies **5.** 50 cents **6.** 386 cents **7.** 9 dimes, 4 dollars, 1 nickel, 4 quarters, 4 pennies **8.** 500 cents **9.** 36 cents **10.** 605 cents **11.** 90 cents **12.** 1 quarter, 3 dimes, 1 penny, 3 nickels **13.** 481 cents **14.** 4 dimes, 5 dollars, 1 quarter, 3 pennies **15.** 40 cents **16.** 169 cents **17.** 2 dimes, 2 quarters, 1 nickel, 5 pennies, 2 dollars **18.** 300 cents **19.** 65 cents **20.** 1 quarter, 2 dollars **21.** 12 cents **22.** 1 dime, 1 quarter, 5 pennies, 1 nickel

*****Note***There could be more than one solution for questions 1, 4, 7, 12, and 14. Accept any reasonable response.**

Page 21

1. $110.68 **2.** $113.46 **3.** $77.35
4. $89.53 **5.** $59.98 **6.** $1412.11
7. $610.29 **8.** $1746.28 **9.** $1390.09
10. $5.61 **11.** $8.81 **12.** $9.62
13. $55.30 **14.** $0.21 **15.** $485.99
16. $249.36 **17.** $178.75 **18.** $139.24
19. $74.73 **20.** $331.68 **21.** $183.16
22. $44.34 **23.** $188.06 **24.** $307.08
25. $675.45 **26.** $3.77 **27.** $4.65
28. $8.18 **29.** $12.12 **30.** $19.55
31. $9.92

Page 23

1. 12 oranges for 99¢ **2.** 5 pears for 49¢
3. 10 apples for 89¢
4. 12 doughnuts for $1.89
5. 25 lbs. of grass seed for $27.75
6. 7 cans of soup for $2 **7.** 12 rolls for 99¢

Page 25

1. (a) Kimberly **(b)** 4 books
(c) 24 books **(d)** 6 books
2. (a) 80 marks **(b)** English
(c) 10 marks **(d)** 90 marks
(e) 300 marks
3. (a) May **(b)** 40 books **(c)** 15 books
(d) 50 books **(e)** April **(f)** 90 books
(g) 85 books

Page 28

1. raw **2.** cents per pound
3. 1980 to 1987 **4.** True **5.** True
6. False **7.** 3 cents **8.** 9 cents

Page 33

1. 2 cl **2.** 7 kg **3.** 200 cm **4.** 2000 L
5. 3 cl **6.** 800 cl **7.** 1 cl **8.** 5 kg
9. 8 cm **10.** 5 g **11.** 50 ml **12.** 1000 L
13. 600 cg **14.** 10000 mg **15.** 4 L
16. 7 g **17.** 8000 m **18.** 9 g **19.** 11 L
20. 100 cg **21.** 3 kg **22.** 70 mm
23. 9000 g **24.** 3 L **25.** 10000 L
26. 110 ml **27.** 4000 L **28.** 12 cg
29. 11 kl **30.** 40 ml **31.** 6000 g
32. 12 m **33.** 12000 L

Page 36

2. 33 mi **3.** 37 m **4.** 34 m **5.** 14 m
6. 152 m **7.** 90 ft **8.** 42 yds **9.** 108 yd
10. 9 cm

Page 38

2. 256 m^2 **3.** 144 cm^2 **4.** 408 ft^2
5. 361 ft^2

Page 40

1. 900 ft^3 **2.** 729 mm^3 **3.** 1920 yd^3
4. 3456 mm^3 **5.** 2002 cubic inches
6. 350 cubic centimeters
7. 3840 cubic feet
8. 72000 cubic centimeters **9.** 9 yd
10. 8 mm **11.** 4 cm
12. 984.9 cubic millimeters
13. 349.2 cubic feet
14. 2307.76 cubic meters

15. 667.0755 cubic centimeters

Page 40

1. 1.8 meters **2.** 3.5 kilometers
3. .003 kilometers **4.** 24000 milligrams
5. 8 packages **6.** 336 hours
7. ½a minute **8.** 8 hours **9.** 180 minutes
10. 120 minutes **11.** less **12.** the same
13. No **14.** Jack