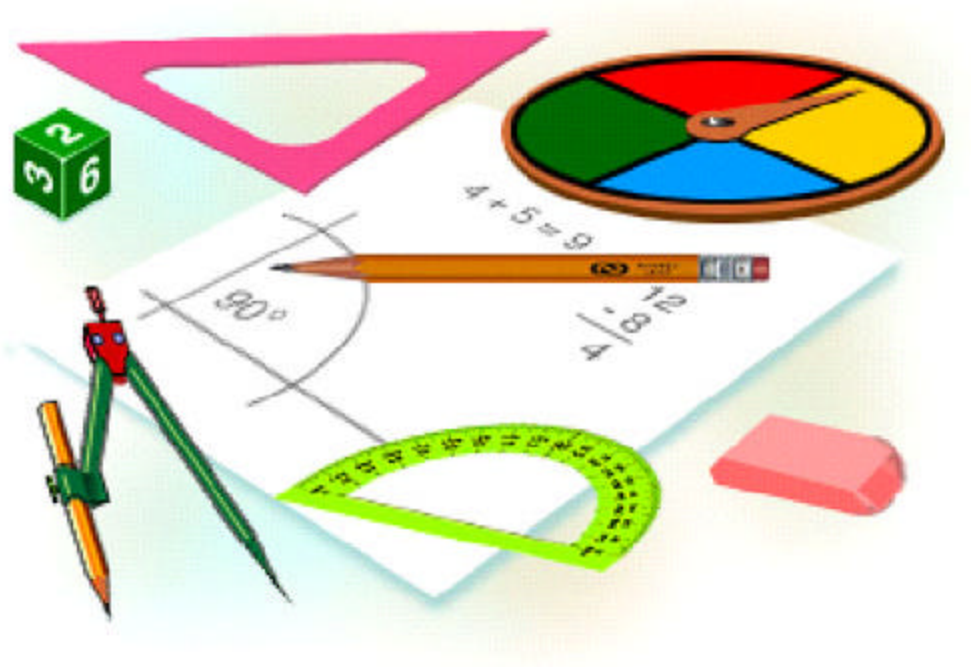
The Next Step

Mathematics Applications for Adults



Book 14012 – Whole Numbers

INTRODUCTION

Why Math?

The most important reason for learning math is that it teaches us how to think. Math is more than adding and subtracting, which can easily be done on a calculator; it teaches us how to organize thoughts, analyze information, and better understand the world around us.

Employers often have to re-educate their employees to meet the demands of our more complex technological society. For example, more and more, we must be able to enter data into computers, read computer displays, and interpret results. These demands require math skills beyond simple arithmetic.

Everyone Is Capable of Learning Math

There is no **type** of person for whom math comes easily. Even mathematicians and scientists spend a lot of time working on a single problem. Success in math is related to practice, patience, confidence in ability, and hard work.

It is true that some people can solve problems or compute more quickly, but speed is not always a measure of understanding. Being "faster" is related to **more practice or experience.**

For example, the reason why math teachers can work problems quickly is because they've done them so many times before, not because they have "mathematical minds".

Working with something that is familiar is natural and easy. For example, when cooking from a recipe we have used many times before or playing a familiar game, we feel confident. We automatically know what we need to do and what to expect. Sometimes, we don't even need to think. However, when using a recipe for the **first** time or playing a game for the **first** time, we must concentrate on each step. We double-check that we have done everything right, and even then we fret about the outcome. The same is true with math. When encountering problems for the very first time, **everyone must have patience** to understand the problem and work through it correctly.

It's Never Too Late to Learn

One of the main reasons people don't succeed in math is that they don't start at the right place. **IMPORTANT! You must begin where *you* need to begin.** Could you hit a homerun if you hadn't figured out which end of the bat had to make contact with the ball? Why should learning math be any different?

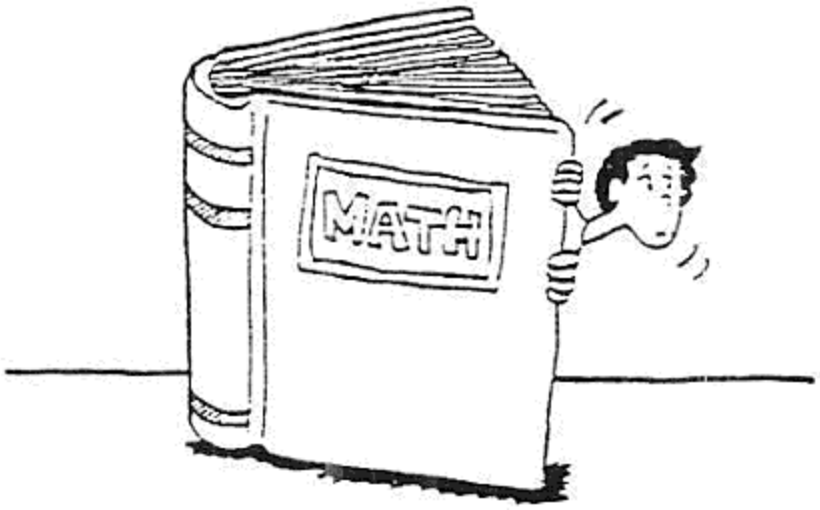
If it has been a while since your last math class, **you must determine what level math you should take.** A teacher or trained tutor can help determine this with a few placement tests and questions.
Sometimes a few tutoring sessions can help you fill gaps in your knowledge or help you remember some of the things you have simply forgotten. It could also be the case where your foundations may be weak and it would be better for you to relearn the basics. **Get some help** to determine what is best for you.

Feeling good about ourselves is what all of us are ultimately striving for, and nothing feels better than conquering something that gives us difficulty. This takes a great deal of courage and the ability

to rebound from many setbacks. This is a natural part of the learning process, and when the work is done and we can look back at our success, nothing feels better.

Where's the best place to hide if you're scared?

Inside a math book because there is safety in numbers.



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OUTLINE

Mathematics - Book 14012

Whole Numbers
Number/Word Recognition
orally name each number when presented with a list of random Arabic numbers (0 – 1,000).
correctly write the number words for Arabic numbers (0 – 1,000).
correctly write the Arabic numerals for any number word (0 – 1,000).
Place Value
recognize the place value of each digit of a number to the thousand's place.
determine how many thousands, hundreds, tens and ones in any number (0 – 1,000).
Counting
count orally from 0 – 1,000 starting at any point in between those numbers.
count orally by 2's, 5's, and 10's to 100.
write all the even numbers from 2 - 100 and all the odd numbers from 1 - 99.
order numbers from greatest to least and least to greatest. (0 – 1,000)
Addition
find the sum of whole numbers up to 3 digits.
Use addition facts to compute sums up to and including 18.
Subtraction
subtract two whole numbers up to 3 digits (no borrowing/regrouping).
use subtraction facts to compute differences up to and

including 18.

THE NEXT STEP

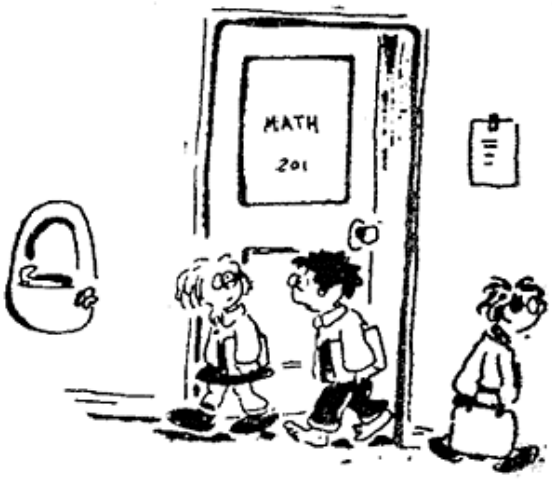
Book 14012

Whole Numbers

Number Recognition

Digit is a counting word. A digit is any of the numerals from **1** to **9.** The word "digit" is also the name for a finger. So number digits can be counted on finger digits.

Our modern system of counting probably came from counting on fingers. Fingers and hands were among the earliest known calculators!



"Wow, what a tough exam. I ran out of fingers."

Number/Word Recognition

Every number can be written two ways.
It can be written as a numeral.
Or it can be written as a word.
The numeral and word stand for the same thing.

Numeral	Word
0	zero
1	one
2	two
3	three
4	four
5	five
6	six
7	seven
8	eight
9	nine

Learn to say these 2-place numbers:

10	ten
11	eleven
12	twelve
13	thirteen
14	fourteen
15	fifteen
16	sixteen
17	seventeen
18	eighteen
19	nineteen

The 2-place numbers go from 10 (ten) to 99 (ninety-nine).
We have just learned about the 2-place numbers from 10 to 19.
Now learn these 2-place numbers:

20	twenty
21	twenty-one
22	twenty-two
23	twenty-three
24	twenty-four
25	twenty-five
26	twenty-six
27	twenty-seven
28	twenty-eight
29	twenty-nine
30	thirty
31	thirty-one
32	thirty-two
33	thirty-three
34	thirty-four
35	thirty-five
36	thirty-six
37	thirty-seven
38	thirty-eight
39	thirty-nine
40	forty
41	forty-one
42	forty-two
43	forty-three
44	forty-four
45	forty-five
46	forty-six
47	forty-seven
48	forty-eight

49	forty-nine
50	fifty
51	fifty-one
52	fifty-two
53	fifty-three
54	fifty-four
55	fifty-five
56	fifty-six
57	fifty-seven
58	fifty-eight
59	fifty-nine
60	sixty
61	sixty-one
62	sixty-two
63	sixty-three
64	sixty-four
65	sixty-five
66	sixty-six
67	sixty-seven
68	sixty-eight
69	sixty-nine
70	seventy
71	seventy-one
72	seventy-two
73	seventy-three
74	seventy-four
75	seventy-five
76	seventy-six
77	seventy-seven
78	seventy-eight
79	seventy-nine
80	eighty
81	eighty-one

82	eighty-two
83	eighty-three
84	eighty-four
85	eighty-five
86	eighty-six
87	eighty-seven
88	eighty-eight
89	eighty-nine
90	ninety
91	ninety-one
92	ninety-two
93	ninety-three
94	ninety-four
95	ninety-five
96	ninety-six
97	ninety-seven
98	ninety-eight
99	ninety-nine

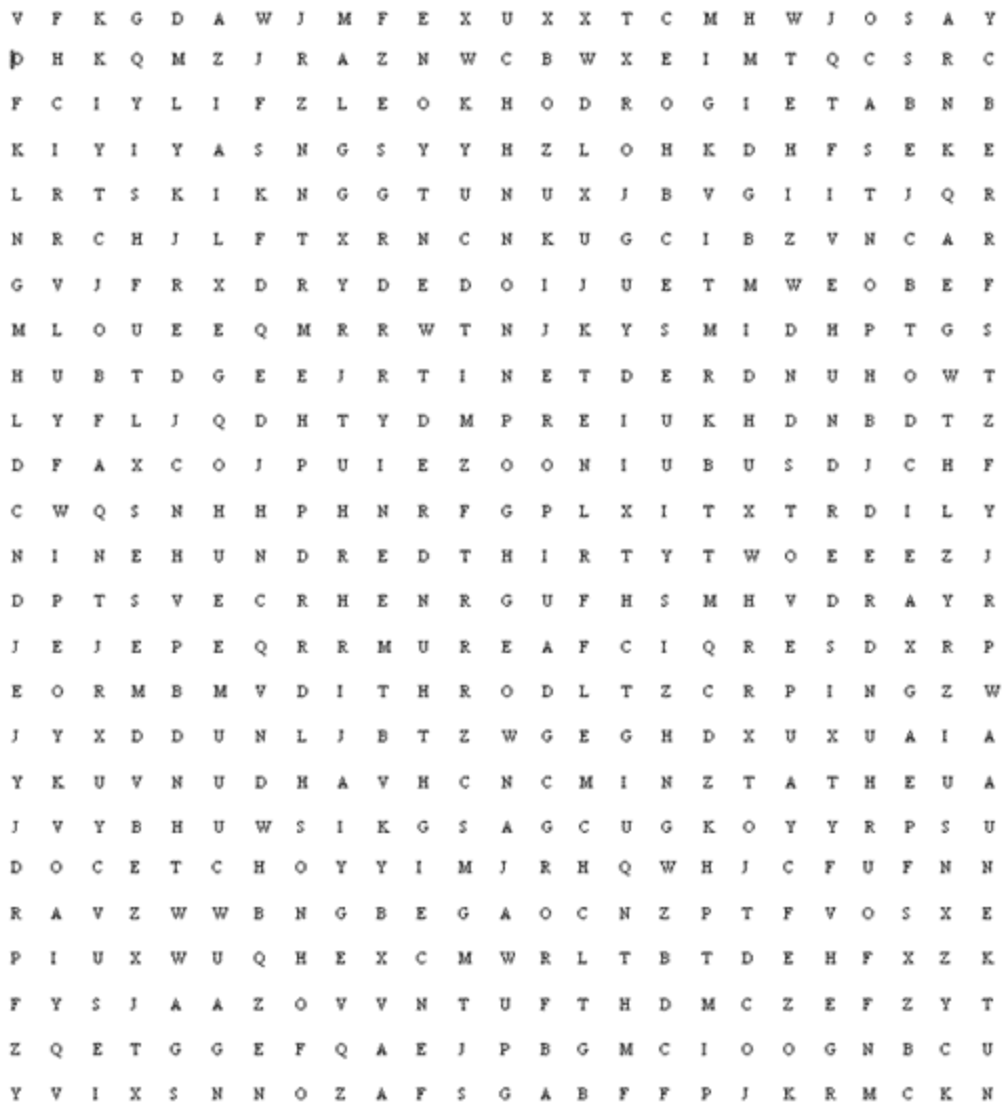
The number 99 is the greatest 2-place number.
The next number in order is 100 (one hundred).

100 is one more than 99.
It is a 3-place number.
It has three numerals: 1, 0, and 0.
They stand for 1 hundred, 0 tens, and 0 ones
The greatest 3-place number is 999 (nine hundred ninety-nine).
It stands for 9 hundreds, 9 tens, and 9 ones.
Every 3-place number tells how many hundreds, tens, and ones the number stands for.
The number 999 is the greatest 3-place number.
The next number in order is 1,000 (one thousand).
It is one more than 999.

It is a 4-place number.
It has four numerals: 1, 0, 0, and 0.
They stand for 1 thousand, 0 hundreds, 0 tens, and 0 ones.
We use a comma after the number in the thousands' place. The comma makes large numbers easier to read.

Peanuts by *Charles Shulz* 12/14 Copyright 1981 by United Feature Syndicate Inc.

Can you find the number words in the following puzzle that match the numerals that follow?



821
400
318
210

548
932
200

560
700
201

Place Value

In the number ***111***, each numeral ***1*** means a different number: ***one, ten,*** and ***one hundred.*** How can the numeral ***1*** stand for so many numbers? That's called ***place value***. The ***value*** of a numeral depends on what ***place*** it's in. If our number system didn't use place value, we would need a lot more than ten numerals (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9)----we'd need millions!

hundreds	**tens**	**ones**
1	**1**	**1**
1 x 10 x 10	**1 x 10**	**1**

To read the place value of numerals in a number, read from left to right.
Each column has a value 10 times greater than the column to its right.

What do these numbers have in common?

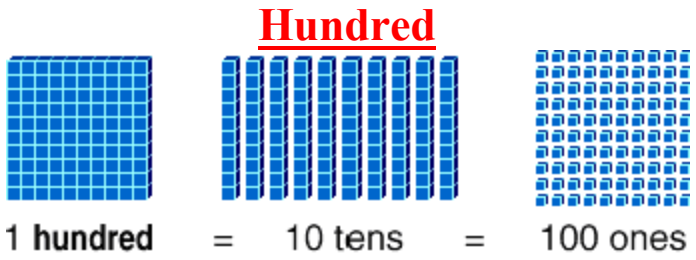
4,321 1,234 3,412 2,143

You probably noticed that they are all 4-**digit** numbers, but did you notice that all four numbers are made up of the same digits: 1, 2, 3, and 4? The digits are the same, but each number has a different value. This is because the digits are in different **places** in each number, and in our number system the place of the digit tells you its value. In other words, each digit in a number has a **place value**.

Below, each number is arranged with each digit under the name of the place in which it stands:

thousands	**hundreds**	**tens**	**units** *or* **ones**
4	3	2	1
1	2	3	4
3	4	1	2
2	1	4	3

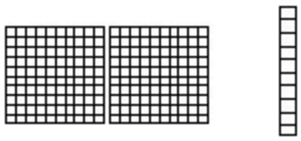
Notice that the 4 in the first number is in the thousands place. That means it is worth 4 thousand. In the second number, the 4 is in the units or ones place. It is worth 4 ones or just plain 4. In the third number, the 4 is in the hundreds place, and it is worth 4 hundred. In the last number, the 4 is in the tens place. That means it is worth 4 tens or 40.



Practice Exercise

Hundreds, Tens and Ones

Count the hundreds, tens and ones. Print the correct number on the line.

1. 

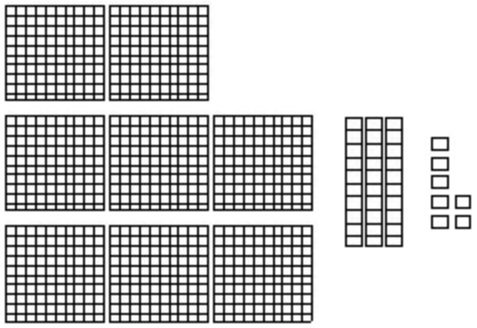
2 hundreds 1 tens 0 ones

is equal to **210**

2. 

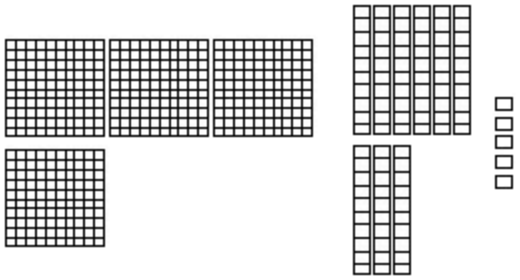
_____ hundreds ___ tens ____ ones

is equal to _____.

3. 

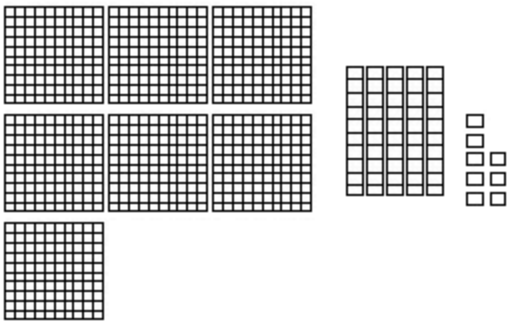
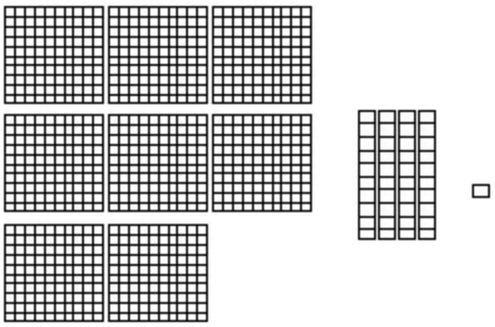
_____ hundreds ___ tens ____ ones

is equal to _____.

4. 

_____ hundreds ___ tens ____ ones

is equal to _____.

5.  **_____ hundreds _____ tens _____ ones** is equal to _____.	6.  **_____ hundreds _____ tens _____ ones** is equal to _____.

Thousands, Hundreds, Tens, and Ones

Write the value of each numeral in the box.

		Thousands	Hundreds	Tens	Ones
1.	113	**0**	**100**	**10**	**3**
2.	5675	_____	_____	_____	_____
3.	374	_____	_____	_____	_____
4.	472	_____	_____	_____	_____
5.	82	_____	_____	_____	_____
6.	7588	_____	_____	_____	_____
7.	713	_____	_____	_____	_____
8.	547	_____	_____	_____	_____
9.	23	_____	_____	_____	_____
10.	2381	_____	_____	_____	_____
11.	291	_____	_____	_____	_____
12.	9293	_____	_____	_____	_____

Which is the greatest number?
That is, which has the most value?

21
29
27

Look at the numbers in the tens' place.
They are all 2s!
So we have to look at the ones' place to find which number is the greatest.

The numbers in the ones' place are 1, 9, and 7.
We know that 9 stands for more ones than 1 or 7.
So 29 is the greatest number.
That is, 29 has the most value.

There is a pattern in our number system.
The more places there are, the greater the number.
The number 40 is greater than 4.
The number 500 is greater than 50.

Counting

The set of counting numbers has no end. It can go on forever. The idea that counting numbers can go on and on is called ***infinity***.

The set of ***counting numbers***, or ***natural numbers***, begins with the number **1** and continues into infinity.

{1,2,3,4,5,6,7,8,9,10...}

The set of ***whole numbers*** is the same as the set of counting

numbers, except that it begins with **0**.

{0,1,2,3,4,5,6,7,8,9,10…}

☞ ***All counting numbers are whole numbers. Zero is the only whole number that is not a counting number.***

Even numbers include the numbers ***0*** and ***2*** and all numbers that can be divided evenly by ***2***. ***Odd numbers*** are all numbers that cannot be divided evenly by ***2***.

Odd and **Even** Numbers to 100

	1	**3**	**5**	**7**	**9**	**11**	**13**	**15**	**17**	**19**	**21**
0	2	4	6	8	10	12	14	16	18	20	
	23	**25**	**27**	**29**	**31**	**33**	**35**	**37**	**39**	**41**	
22	24	26	28	30	32	34	36	38	40		
	43	**45**	**47**	**49**	**51**	**53**	**55**	**57**	**59**	**61**	
42	44	46	48	50	52	54	56	58	60		
	63	**65**	**67**	**69**	**71**	**73**	**75**	**77**	**79**	**81**	
62	64	66	68	70	72	74	76	78	80		
	83	**85**	**87**	**89**	**91**	**93**	**95**	**97**	**99**		
82	84	86	88	90	92	94	96	98	100		

Skip Counting

To count by 2's, simply count all the even numbers: 0, 2, 4, 6, 8, 10…and so on.

To count by 5's: 0, 5, 10, 15, 20…and so on.

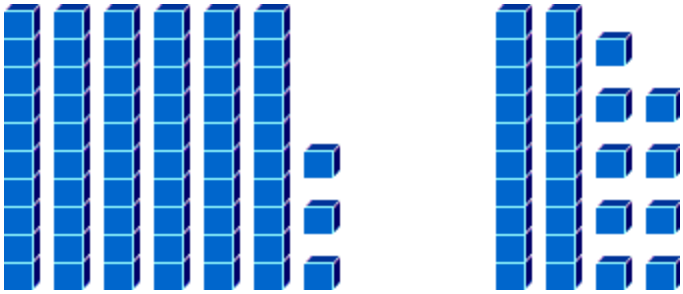
To count by 10's: 0, 10, 20, 30, 40…and so on.

To count by 100's: 0, 100, 200, 300, 400…and so on.

Ordering numbers means listing numbers from least to greatest, or from greatest to least. Two symbols are used in ordering.

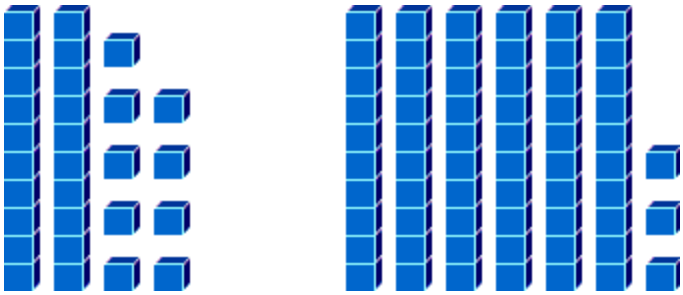
<	>
is less than	**is greater**
2 < 10	**10 > 2**

Greater Than >



63 is **greater than** 29.
63 > 29

Less Than <



29 is **less than** 63.
29 < 63

Practice Exercise

Fill in the blanks to complete the numerical sequence.
The first one is already done for you.

1.	6	11	16	21	26	**31**
2.	8	10	12	_____	16	_____
3.	5	10	_____	20	25	_____
4.	20	30	_____	50	60	_____
5.	15	20	_____	30	35	_____
6.	15	25	_____	45	55	_____
7.	3	5	7	9	_____	13
8.	16	17	_____	19	_____	21
9.	118	113	_____	103	98	_____
10.	60	65	_____	75	80	85
11.	43	42	41	_____	39	_____
12.	65	67	69	_____	73	_____
13.	95	96	97	_____	99	_____
14.	64	59	_____	49	44	39
15.	40	50	60	_____	80	_____

Number Comparison

Compare the two numbers.
In the middle of the two numbers, write either > (greater than), < (less than), or = (equals) to complete the problem.

1.	481	>	two hundred sixty-three
2.	641	_____	866
3.	269	_____	208
4.	37	_____	78
5.	eight hundred seventy-four	_____	343
6.	869	_____	25
7.	368	_____	429
8.	74	_____	361
9.	92	_____	59
10.	612	_____	858
11.	94	_____	659
12.	nine hundred eighty-one	_____	five hundred forty-six

Be careful when comparing numbers using commas (,) and decimal points (.). For example: Which is greater: 1.000 or 1,000? The first number (1.000) is one,

and the second number (1,000) means one thousand. Therefore, 1,000 is greater than 1.000. The decimal point separates whole numbers from decimal fractions. The comma is used only with whole numbers and, in this case, is used to separate hundreds from thousands. When inserting commas in numbers, make sure that you write them clearly so that they are not confused with decimal points.

Addition

Combining two or more numbers is called ***addition***. The term for addition is ***plus***, and the symbol for plus is +. The numbers that are combined in addition are called ***addends*** and together they form a new number called a ***sum***.

2 ---- addends ---- 3

+ 2 + 1

4 ---- sum --------- 4

Adding whole numbers is as simple as 2 + 2! To add two whole numbers, you can simply follow the number line and complete the addition fact.

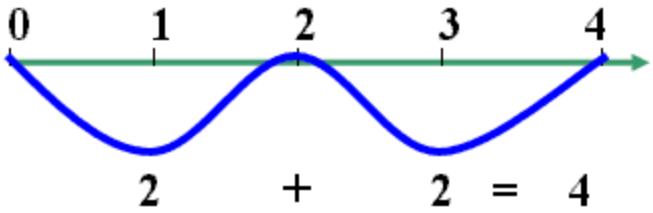
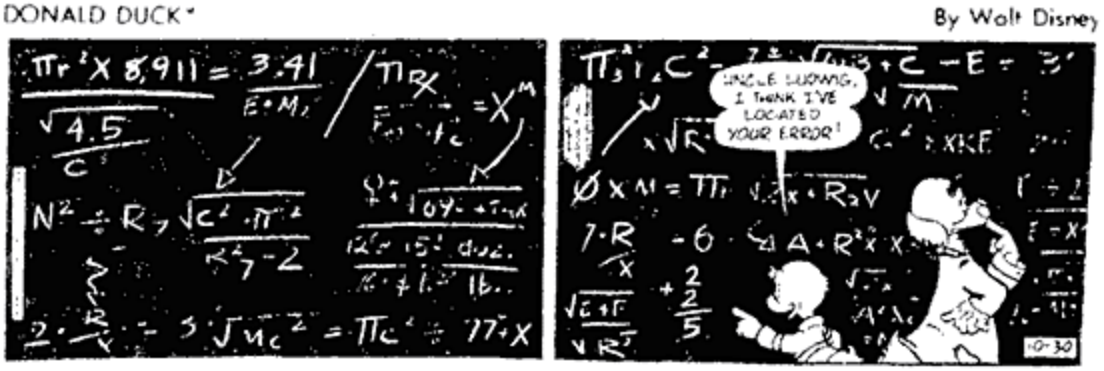


Table of Addition Facts

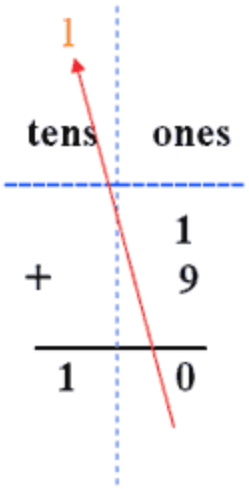
+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

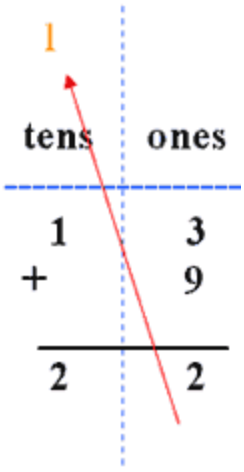


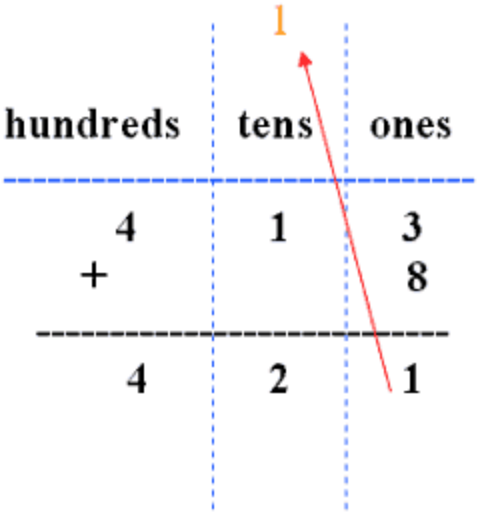
Donald Duck by *Walt Disney* 10/30 Copyright

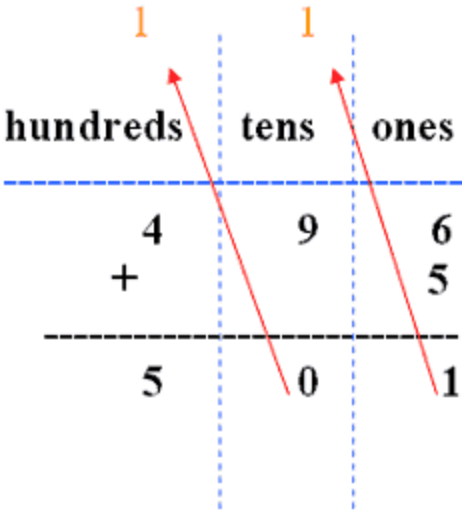
Regrouping Numbers in Addition

Addition often produces sums with a value greater than ***9*** in a given place. The value of ten is then ***regrouped*** (or ***carried***) to the next place.









To explain addition another way, it can be done by adding the place value amounts separately.

e.g. 69
+ 8
17
60 (the 6 in the tens place means 6 tens or "60")
77

⇒ If there are not enough digits in each number to make even columns under each place value, then zeros may be used **before** a given number to make adding easier. Do **not** add zeros **after** a number because it changes the value of the whole number.

e.g. 69 + 8 + 125 could be added as:

069
008
+125

Practice Exercise

32 + 57	89 + 10	60 + 20 =	46 + 43
80 + 71	81 + 85	40 + 90 =	12 + 71
16 + 70	75 + 15	15 + 94 =	19 + 88
180 + 305	204 + 412	409 + 310 =	505 + 372
731 + 158	256 + 322	804 + 171 =	886 + 102
989 + 145	457 + 525	756 + 649 =	410 + 822
427 + 142	861 + 445	841 + 883 =	186 + 101

				785
		57	905	906
2	10	68	123	128
0	20	73	34	34
+ 6	+ 33	+ 80	+ 7	+ 1

Subtraction

"Taking away" one or more numbers from another number is called ***subtraction***. The term for subtraction is ***minus***, and the symbol for minus is **-**. The number being subtracted is called a ***subtrahend***. The number being subtracted from is called a ***minuend***. The new number left after subtracting is called a ***remainder*** or ***difference***.

4 ---- minuend ---- 4
- 2 --subtrahend - - 1
2 – difference ---- 3

The complete addition or subtraction "sentence" is called an ***equation***. An equation has two parts. The two parts are separated by the ***equal sign***, =. For example, ***the minuend minus the subtrahend equals the difference***. An ***addition fact*** or a ***subtraction fact*** is the name given to specific addition or subtraction equations.

0 + 1 = 1
1 + 1 = 2
2 + 1 = 3
3 + 1 = 4
4 + 1 = 5

1 – 1 = 0
2 – 1 = 1
3 – 1 = 2
4 – 1 = 3
5 – 1 = 4

5 + 1 = 6
6 + 1 = 7
7 + 1 = 8
8 + 1 = 9

6 – 1 = 5
7 – 1 = 6
8 – 1 = 7
9 – 1 = 8

When subtracting larger numbers, subtract the column on the right first, and then move to the next column to the left. Continue until you have subtracted each column of figures.

Examples

```
  46
-25
  21
```

Step 1. 6 – 5 = 1
Step 2. 4 – 2 = 2

```
  364
-263
  101
```

Step 1. 4 – 3 = 1
Step 2. 6 – 6 = 0
Step 3. 3 – 2 = 1

To check a subtraction problem, add the answer to the bottom number of the original problem. The sum should be the top number of the original problem.

Check

```
  46 √
-25
  21
  46 √
 364 √
-263
 101
 364 √
```

Step 1. 5 + 1 = 6
Step 2. 2 + 2 = 4

Step 1. 3 + 1 = 4
Step 2. 6 + 0 = 6

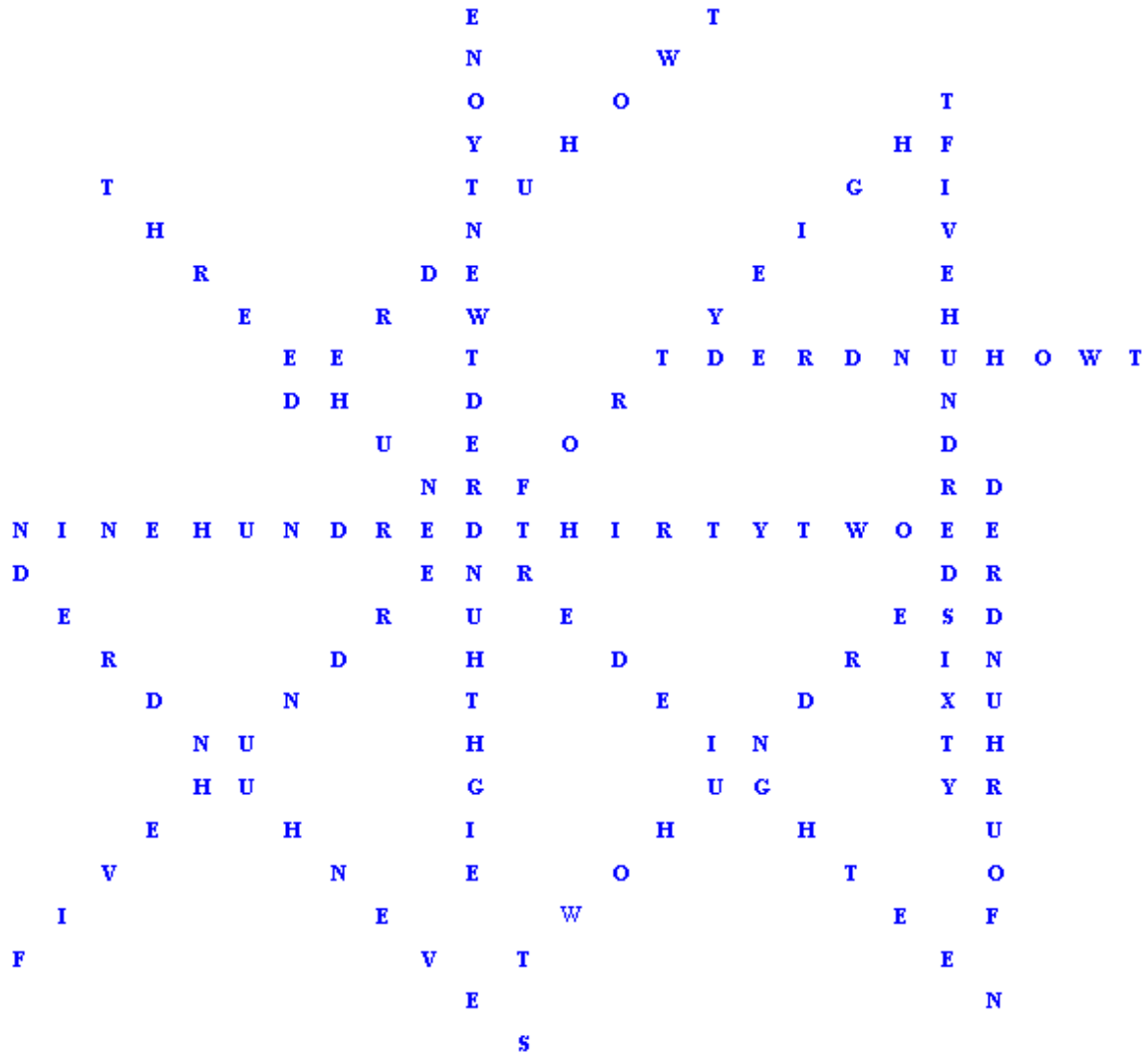
Practice Exercise

7 − 4	9 − 3	1 – 1 =	7 − 6	9 − 7
67 − 44	95 − 24	19 – 12 =	19 − 11	78 − 14
80 − 60	33 − 22	99 – 37 =	22 − 11	10 − 10
33 − 20	91 − 80	15 – 11 =	77 − 33	17 − 11
647 − 235	177 − 135	629 – 402 =	612 − 501	877 − 106
725 − 103	663 − 242	456 – 103 =	485 − 234	732 − 211
215 − 103	340 − 120	577 – 114 =	388 − 223	434 − 303

Answer Key

Book 14012 – Whole Numbers

Page 13



Page 16

2. 3 hundreds 3 tens 3 ones is equal to 333.
3. 8 hundreds 3 tens 7 ones is equal to 837.
4. 4 hundreds 9 tens 5 ones is equal to 495.
5. 7 hundreds 5 tens 8 ones is equal to 758.
6. 8 hundreds 4 tens 1 one is equal to 841.

Page 17

	Thousands	Hundreds	Tens	Ones
2.	5000	600	70	5
3.	0	300	70	4
4.	0	400	70	2
5.	0	0	80	2
6.	7000	500	80	8
7.	0	700	10	3
8.	0	500	40	7
9.	0	0	20	3
10.	2000	300	80	1
11.	0	200	90	1
12.	9000	200	90	3

Page 21

2. 14, 18 **3.** 15, 30 **4.** 40, 70 **5.** 25, 40 **6.** 35, 65 **7.** 11 **8.** 18, 20 **9.** 108, 93 **10.** 70 **11.** 40, 38 **12.** 71, 75 **13.** 98 **14.** 54 **15.** 70, 90

Page 22

2. < **3.** > **4.** < **5.** > **6.** > **7.** < **8.** < **9.** > **10.** < **11.** < **12.** >

Page 27

Row 1: 89, 99, 80, 89
Row 2: 151, 166, 130, 83
Row 3: 86, 90, 109, 107
Row 4: 485, 616, 719, 877
Row 5: 889, 578, 975, 988
Row 6: 1134, 982, 1405, 1232
Row 7: 569, 1306, 1724, 287

Row 8: 8, 63, 278, 1069, 1854

Page 30

Row 1: 3, 6, 0, 1, 2
Row 2: 23, 71, 7, 8, 64
Row 3: 20, 11, 62, 11, 0
Row 4: 13, 11, 4, 44, 6
Row 5: 412, 42, 227, 111, 771
Row 6: 622, 421, 353, 251, 521
Row 7: 112, 220, 463, 165, 131