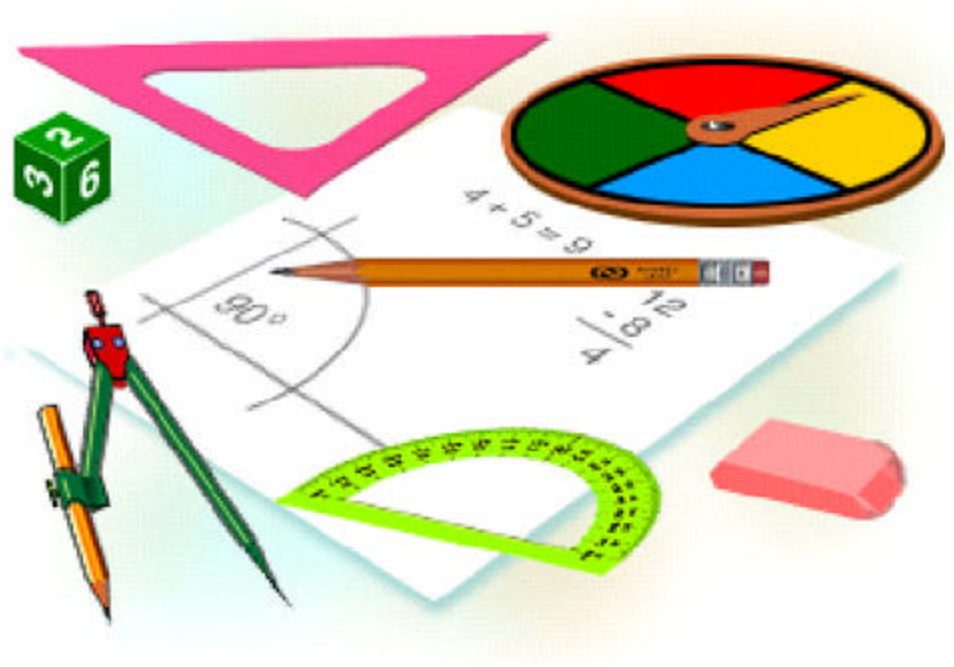
The Next Step

Mathematics Applications for Adults



Book 14011

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?

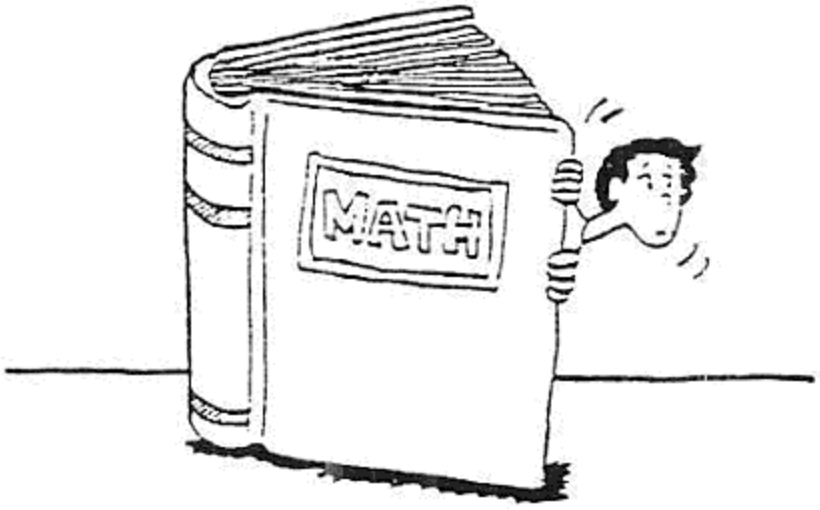
If it has been a while since your last math class, **you must determine what level math you should take.** A teacher or trained tutor can help determine this with a few placement tests and questions.

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 14011

Whole Numbers
Number/Word Recognition
orally name each number when presented with a list of random Arabic numbers (0 – 100).
correctly write the number words for Arabic numbers (0 - 100).
correctly write the Arabic numerals for any number word (0 - 100).
Place Value
recognize the place value of each digit of a number to the ten's place.
determine how many tens and ones in any number (0 - 100).
Counting
count orally from 0 - 100 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 - 100)
Addition
use addition facts to compute sums up to and including 18.

Subtraction
use subtraction facts to compute differences up to and including 18.
Measurement
Time
read hours on an analog clock face.

THE NEXT STEP

Book 14011

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!

Archie by *Bob Montana* 2-14 Copyright 1974 by Archie Comic Publications Inc.

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 biggest 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.

Practice Exercise

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

U E F O R T Y S F N

O N G W V X L E C I

S I X T Y S E V E N

A N Q Y W H C E H E

F Y O T T J C N Y T

T T V R N O T T E Y

Q N C I N N H Y T F

S E I H S G O S F O

E W G T I C S I S U

U T M E U C G X G R

80 40 94

76 67 32

29

Place Value

You probably use place value all the time without even knowing it. Place value tells you the value of each digit in a number. In our numeration system, each place has 10 times the value of the place to its right.

In the number ***11***, each numeral ***1*** means a different number: ***one*** and ***ten.*** How can the numeral ***1*** stand for two different 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!

tens ones

1 1

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.

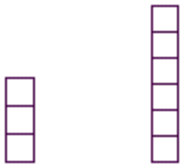
Tens **Ones**

20 ones = 2 tens **3 ones**

Practice Exercise

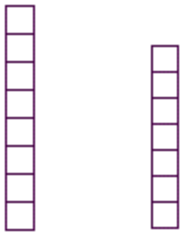
Are you ready to do unit counting? On the next page, you need to count the tens and ones units and write the correct numbers in the spaces. The first one has been done for you. Good luck!

tens 5 ones 7 = 57

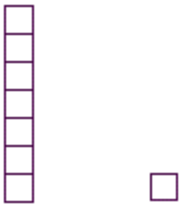


tens ones = ___

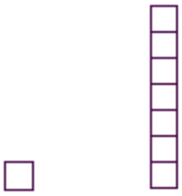
tens ones = ___



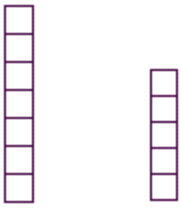
tens ones = ___



tens ones = ___

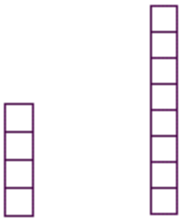


tens ones = ___



tens ones = ___

tens ones = ___



tens ones = ___

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.

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...}

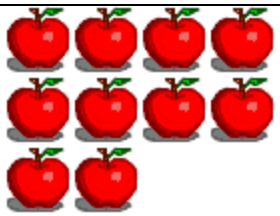
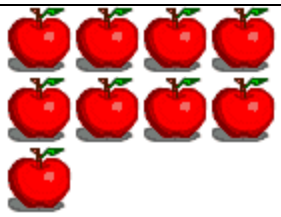
The set of ***whole numbers*** is the same as the set of counting numbers, except that it begins with **0**.

{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.***

Practice Exercise

Count the fruit. Fill in the box with the correct number of fruit.

1.  ☐ 6 ☐ 3 ■ 9	2.  ☐ 10 ☐ 7 ☐ 4
3.  ☐ 2 ☐ 7 ☐ 8	4.  ☐ 3 ☐ 10 ☐ 5
5.  ☐ 7 ☐ 9 ☐ 8	6.  ☐ 4 ☐ 5 ☐ 2
7.  ☐ 9 ☐ 8 ☐ 10	8.  ☐ 3 ☐ 6 ☐ 7

Write the Number Before, After, and Between

Write the number that comes before, between, or after.
The first answer in each is done for you.

Before		Between			After	
83	84	95	**96**	97	50	**51**
	4	89		91	72	
	21	33		35	59	
	90	35		37	2	
	17	7		9	3	
	63	43		45	11	
	100	49		51	83	
	34	98		100	99	

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

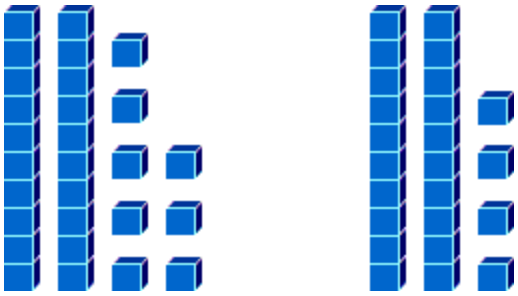
To count by 2's, simply count all the even numbers: 0, 2, 4, 6, 8, 10…and so on.

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.

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



28 **is greater than (>)** 24.

Less Than

17 is **less than (<)** 27

Practice Exercise

Number Comparison

Circle the **greatest** number in each set.

1.	**8**	1	**2.**	6	7	**3.**	5	2
4.	4	7	**5.**	1	2	**6.**	6	1
7.	81	80	**8.**	18	15	**9.**	17	15
10.	0	18	**11.**	13	6	**12.**	3	0
13.	7	18	**14.**	17	16	**15.**	three	eleven
16.	31	38	**17.**	15	3	**18.**	16	15
19.	11	8	**20.**	36	34	**21.**	three	two
22.	sixty	ten	**23.**	76	77	**24.**	16	14
25.	thirteen	8	**26.**	fourteen	17	**27.**	three	15
28.	88	89	**29.**	19	four	**30.**	30	14
31.	12	eighteen	**32.**	nineteen	27	**33.**	one	twelve
34.	three	13	**35.**	17	five	**36.**	73	37
37.	six	four	**38.**	14	ninety	**39.**	sixty	55

Circle the **least** number in each set.

1. 6 **1**	**2.** 2 7	**3.** 6 4
4. 51 23	**5.** 31 49	**6.** 59 66
7. 47 89	**8.** 49 30	**9.** 91 92
10. 43 41	**11.** 45 36	**12.** 71 80
13. 90 60	**14.** 12 two	**15.** 13 12
16. four sixteen	**17.** 43 42	**18.** 50 69
19. 71 83	**20.** 19 10	**21.** 10 29
22. nineteen ten	**23.** 14 13	**24.** 5 6
25. 7 sixty	**26.** 70 ten	**27.** sixteen 13
28. 87 90	**29.** 16 14	**30.** 17 26
31. 8 seventeen	**32.** 14 10	**33.** 6 nineteen
34. fifteen one	**35.** 18 7	**36.** 10 5
37. four eleven	**38.** 4 seven	**39.** 12 4

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

1.	99	>	66	2.	eighty-seven	__	64
3.	30	__	68	4.	21	__	89
5.	75	__	31	6.	48	__	64
7.	50	__	17	8.	eighty-three	__	thirteen
9.	88	__	83	10.	43	__	28
11.	32	__	41	12.	48	__	47
13.	82	__	42	14.	53	__	52
15.	86	__	87	16.	75	__	94
17.	seventy-four	__	twelve	18.	42	__	33
19.	40	__	49	20.	33	__	15
21.	40	__	82	22.	16	__	24
23.	46	__	thirty-two	24.	42	__	fifty-nine

1. Which answer has two more than 5 paintbrushes?

☐ 

☐ 

☐ 

2. Which number is greater than 2 but less than 10?

☐ 19
☐ 10
☐ 1
☐ 14
☐ 3

3. If you are counting by ones, which number comes after 24?

☐ 26
☐ 23
☐ 14
☐ 35
☐ 25

4. Which number is missing in this pattern?
28, 26, 24, ___, 20

☐ 22
☐ 29
☐ 26
☐ 30
☐ 21

5. Which pattern needs the number 6 in the blank space?

- ☐ 0, ___, 2, 3
- ☐ 4, 5, ___, 7
- ☐ 0, 1, ___, 3
- ☐ 8, 9, 10, ___

6. Look at the following list of numbers. If you arrange the numbers from least to greatest, which number would come fifth? 23, 22, 25, 21, 36, or 27

- ☐ 23
- ☐ 22
- ☐ 21
- ☐ 27
- ☐ 25
- ☐ 36

7. Which number is missing in this pattern?
44, ___, 54, 59, 64

- ☐ 52
- ☐ 48
- ☐ 51
- ☐ 49
- ☐ 47

8. If you are counting by tens, which number comes before 34?

- ☐ 37
- ☐ 31
- ☐ 44
- ☐ 24
- ☐ 41

9. Which pattern needs the number 12 in the blank space?

- ☐ 5, ___, 7, 8
- ☐ 3, ___, 5, 6
- ☐ 2, 3, ___, 5
- ☐ 10, 11, ___, 13

10. Which number is missing in this pattern?
33, 38, 43, ___, 53

- ☐ 48
- ☐ 45
- ☐ 52
- ☐ 46
- ☐ 44

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.

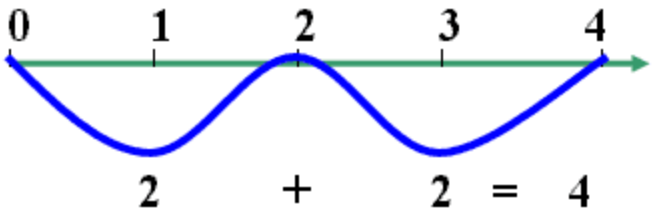


Table of Addition Facts

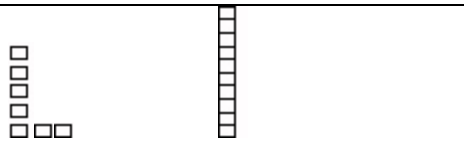
+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18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

The order in which the numbers are added does not change the result. (e.g. 5 + 6 = 11 or 6 + 5 = 11) this rule applies whether you add two numbers or ten numbers.

Dennis The Menace by *Hank Ketcham*

Practice Exercise

Count the boxes. Solve for each of the given problems.

1.  **6 + 4 = 10**	2.  ____ + **4** = ____
3.  ____ + **2** = ____	4.  **2** + ____ = ____
5.  ____ + ____ = ____	6.  ____ + ____ = ____
7.  ____ + ____ = ____	8.  ____ + ____ = ____

7 + 4	2 + 2	9 + 5	3 + 8	7 + 9
9 + 2	4 + 5	3 + 6	3 + 8	9 + 1
6 + 6	9 + 6	5 + 8	6 + 1	3 + 5
3 + 1	9 + 5	3 + 8	9 + 5	7 + 7

5 + 7 =	9 + 9 =	3 + 2 =	5 + 5 =	1 + 5 =
6 + 6 =	1 + 8 =	3 + 5 =	3 + 9 =	5 + 6 =
4 + 8 =	7 + 4 =	8 + 9 =	2 + 3 =	

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***.

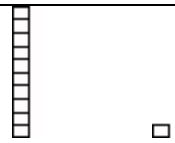
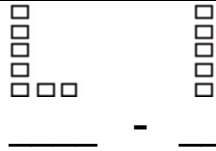
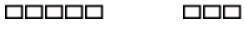
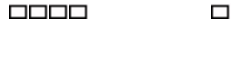
4 ---- minuend ---- 4
- 2 --subtrahend - - 1
2 – difference ---- 3

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 = 0**
1 + 1 = 2	**2 – 1 = 1**
2 + 1 = 3	**3 – 1 = 2**
3 + 1 = 4	**4 – 1 = 3**
4 + 1 = 5	**5 – 1 = 4**
5 + 1 = 6	**6 – 1 = 5**
6 + 1 = 7	**7 – 1 = 6**
7 + 1 = 8	**8 – 1 = 7**
8 + 1 = 9	**9 – 1 = 8**

Practice Exercise

Count the boxes. Solve for each of the given problems.

1.  **10 - 1 = 9**	2.  **2 - ____ = ____**
3.  **1 - ____ = ____**	4.  **8 - ____ = ____**
5.  ____ - ____ = ____	6.  ____ - ____ = ____
7.  ____ - ____ = ____	8.  ____ - ____ = ____

4 - 1	4 - 2	9 - 2	9 - 1	4 - 3
6 - 2	8 - 5	8 - 2	7 - 6	7 - 4
8 - 5	6 - 4	8 - 6	7 - 3	3 - 1
1 - 1	7 - 2	6 - 5	6 - 4	7 - 6

8 – 2 =	9 – 7 =	7 – 7 =	8 – 4 =	3 – 2 =
8 – 1 =	7 – 5 =	7 – 3 =	4 – 4 =	5 – 1
4 – 1 =	8 – 5 =	6 – 1 =	9 – 4 =	9 – 6 =

Measurement

Time

Analog Clock

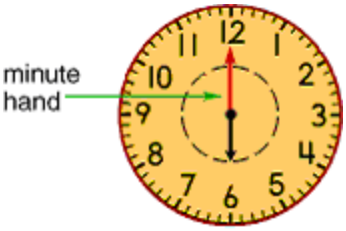
We divide ***days*** into 24 ***hours***, but hours are divided into ***60*** parts. Roman astronomers called each division a ***par minuta*** or "small part of an hour." From the Latin name comes our word ***minute***. These early astronomers also divided minutes into *60* equal parts. They called each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

Measures of Time

1 minute (min.) = 60 seconds (sec.)
1 hour (hr.) = 60 minutes
1 day (da.) = 24 hours
1 week (wk.) = 7 days
1 year (yr.) = 365 days

Hour Hand

Minute Hand



Second Hand

O'clock

The clock shows 1 **o'clock**

Can you tell what time it is? The short hand tells the hour and the long hand tells the minutes. You start with the short hand and say the hour and then the long hand and say the minutes. Try these and see how well you can tell time.

1.  _____ o'clock	2.  _____ o'clock
3.  _____ o'clock	4.  _____ o'clock
5.  _____ o'clock	6.  _____ o'clock

CURRICULUM OBJECTIVES

NUMBER RECOGNITION			
Arabic Numbers	1	understand and use correctly the word “digit”	
	2	recognize Arabic numbers: 0 - 100	
NUMBER/WORD RECOGNITION			
Number Words	1	write the number words for 0 -10	
	2	write the number words for 10 - 100	
PLACE VALUE			
Place Value	1	identify place value in numbers 0 - 100	
COUNTING			
Counting	1	orally from 0 – 100, starting any place in between	
	2	drill and practice counting by 1’s, 2’s, 5’s, and 10’s (0 – 100)	
Other	3	recognize “<” and “>” signs	
	4	explain even and odd numbers	
	5	order numbers from least to greatest and greatest to least	
ADDITION			
Terms	1	use the terms “addend” and “sum”	
	2	explain relationship between adding and counting	
	3	recognize and use “+” sign and the “=” sign	
	4	explain “whole number”	
Addition	5	demonstrate an understanding of addition	
	6	master addition facts up to and including 18	
	7	add numbers in columns	
	8	add numbers written in equation form	
	9	the order in which numbers are added doesn’t change the sum	
SUBTRACTION			
Terms	1	use “find the difference between” to signify subtraction	
	2	know the meaning of the subtraction sign “-“	
Subtraction	3	demonstrate and understanding of subtraction	
	4	master subtraction facts up to and including 18	
	5	subtract numbers written in columns	
	6	subtract numbers written in equation format	
	7	explain the relation between addition and subtraction	
TIME			
Clocks	1	read hours on an analog clock	