

## What We Are Learning

## Understanding Integers

## Vocabulary

These are the math words we are learning:

**absolute value** the distance from 0 on a number line. The symbol for absolute value is  $| \quad |$

**coordinates** the numbers in an ordered pair that locate a point on a coordinate graph

**coordinate plane** formed by two number lines in a plane that intersect at right angles at zero on each number line

**integers** the set of all whole numbers and their opposites

**negative number** integer less than zero

**opposites** two numbers that are an equal distance from zero on a number line

**origin** the point where the  $x$ -axis and  $y$ -axis intersect on the coordinate plane

**positive number** integer greater than zero

**quadrants** the four areas created by the axes on a coordinate plane

**$x$ -axis** the horizontal axis on the coordinate plane

**$x$ -coordinate** the first value in an ordered pair

**$y$ -axis** the vertical axis on the coordinate plane

*Dear Family,*

Your child will begin the study of an important set of numbers called **integers**. Integers are the set of numbers that include both positive and negative whole numbers. Your child will learn to identify and graph these numbers on a number line.

**Name a positive or negative number to represent each situation.**

**A.** a gain of 2 points in the stock market

Positive numbers can represent gains or increases.  
 $+ 2$

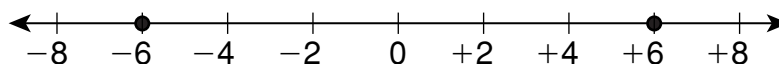
**B.** a 15 yard penalty in football

Negative numbers can represent losses or decreases.  
 $-15$

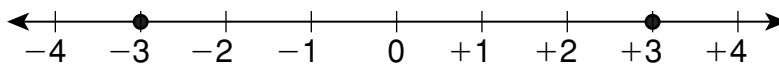
To help your child understand integers, it is helpful to graph an integer and its opposite on a number line. **Opposites** are two numbers that are an equal distance from zero on a number line.

**Graph the integer 6 and its opposite on a number line.**

$+ 6$  is the same distance from 0 as  $-6$ .



**Absolute value** represents the distance an integer is from zero. The absolute value of a number is always positive because it reflects a distance, which is always a positive value. Therefore, opposites always have the same absolute value.

**Use the number line to find the absolute value of  $|-3|$ .**

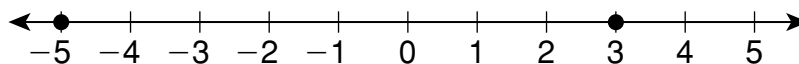
$-3$  is 3 units from 0, so  $|-3| = 3$ .

**y-coordinate** the second value in an ordered pair

Your child will also learn to compare and order integers. It is important to remember that negative numbers are **ALWAYS** less than positive numbers.

**Use the number line to compare each pair of integers. Write  $<$  or  $>$ .**

$$-5 \square 3$$

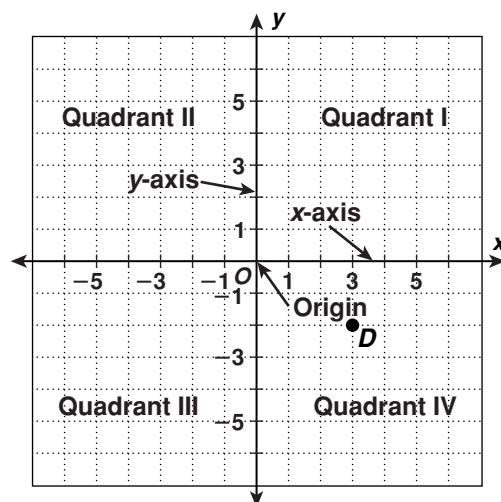


$-5$  is to the left of  $3$  on the number line.

$$-5 < 3$$

Once your child has a basic understanding of integers, he or she will be introduced to the **coordinate plane**. He or she will plot points or identify points in all four **quadrants** of the coordinate plane. For example:

**Give the coordinates of point  $D$ .**



From the origin,  $D$  is three units to the right and 2 units down.

$$(3, -2)$$

This is just the beginning of your child's involvement with integers. Understanding the concept of positive and negative values is imperative as your child continues in mathematics.

**Sincerely,**

**CHAPTER 11** **Family Letter**  
**11 Understanding Integers**

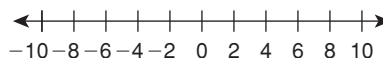
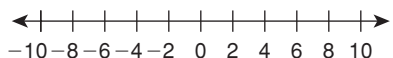
Name a positive or negative number to represent each situation.

1. a loss of 15 yards in football \_\_\_\_\_      2. an increase of 52 points \_\_\_\_\_

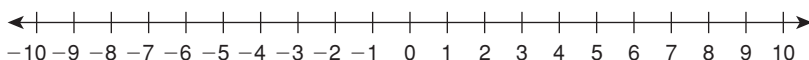
Graph each integer and its opposite on a number line.

3. 10

4. -8



Use the number line to find the absolute value of each integer.



5.  $|-4|$

6.  $|6|$

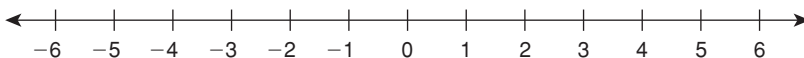
7.  $|-9|$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Use the number line to compare each pair of integers. Write  $<$  or  $>$ .



8.  $0$  \_\_\_\_\_  $-5$

9.  $-3$  \_\_\_\_\_  $5$

10.  $-2$  \_\_\_\_\_  $-4$

Order the integers in each set from least to greatest.

11.  $-6, 2, -4$

12.  $0, -5, -7$

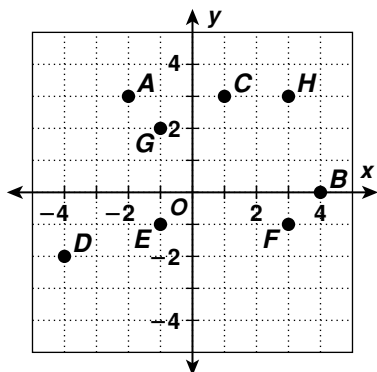
13.  $-9, 8, 1, -1$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Use the coordinate plane to answer Exercises 14 – 19.



Name the quadrant where each point is located.

14.  $D$

15.  $H$

16.  $A$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Give the coordinates of each point.

17.  $C$

18.  $B$

19.  $F$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Answers: 1. -15 2. +52 3. 4. 5. 4 6. 6 7. 9 8.  $>$  9.  $<$  10.  $>$  11. -6, -4, 2 12. -7, -5, 0 13. -9, -1, 1, 8 14. III 15. I 16. I 17. (1, 3) 18. (4, 0) 19. (3, -1)

**Family Fun****Integer Game****Objective**

The objective is to collect all of the cards in the deck.

**Materials**

Deck of cards

**Directions**

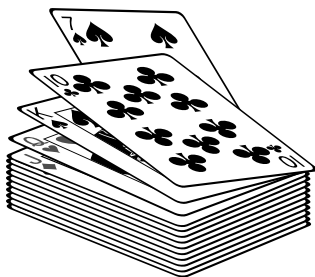
Deal out the entire deck to every person playing in the game. Make sure the cards are face down.

Every round is played the same way: each player turns over the top card in his or her hand. The player who has the card with the greatest value takes all the cards played that round.

**However...**

- Each **black** card holds a positive value with the aces being the least value and the kings being the greatest value.
- Each **red** card holds a negative value with the aces having the greatest value and the kings having the least value.

For example: If a red 7 and a black 2 are turned over, the player with the black 2 will win that round because  $2 > -7$ .



If there is a tie, or a round where two cards with the same value are turned up, each player deals out 3 cards face down. The last card dealt is turned over. The player with the card with the greatest value takes all the cards that round.

The winner is the player who ends up with all the cards or who has the greatest number of cards at the end of the game.

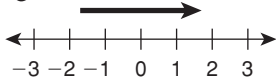
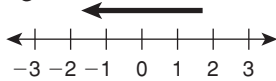


## What We Are Learning

## Integer Operations

*Dear Family,*

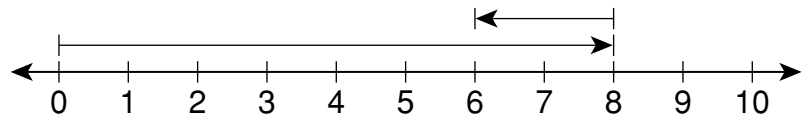
In this section, your child will learn to perform the basic operations of addition, subtraction, multiplication, and division on integers.

Your child will use a number line to help add and subtract integers.

Integer Addition	Integer Subtraction
<p>Move <b>right</b> on the number line to add a positive integer.</p> 	<p>Move <b>left</b> on the number line to subtract a positive integer.</p> 
<p>Move <b>left</b> on the number line to add a negative integer.</p> 	<p>Move <b>right</b> on the number line to subtract a negative integer.</p> 

**Find the sum.**

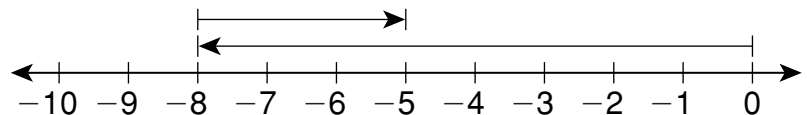
$$8 + (-2)$$



$$8 + (-2) = 6$$

**Find the difference.**

$$-8 - (-3)$$



$$-8 - (-3) = -5$$

The rules for multiplying and dividing integers are easier to use and to remember. The sign and/or signs of the integers will dictate which sign the product or quotient will have.

- If the signs are the same, the product or quotient will be **POSITIVE**.
- If the signs are different, the product or quotient will be **NEGATIVE**.

**Find each product or quotient.**

**A.**  $6 \cdot (-3)$       Multiply.

$6 \cdot (-3) = -18$       The signs are different, so the answer is negative.

**B.**  $-56 \div (-8)$       Divide.

$-56 \div (-8) = 7$       The signs are the same, so the answer is positive.

Your child will use the basic operations to solve simple equations involving integers.

**Solve.**

$$-7a = 35$$

$$\frac{-7a}{-7} = \frac{35}{-7}$$

$$a = -5$$

$a$  is multiplied by  $-7$ . Divide both sides by  $-7$ .

Your child will continue the study of integers throughout all aspects of mathematics. Help your child master these important skills by reviewing the concepts taught throughout this chapter.

**Sincerely,**

## CHAPTER

## 11

**Family Letter****Integer Operations**

Find each sum.

1.  $-8 + 3$

\_\_\_\_\_

2.  $6 + (-6)$

\_\_\_\_\_

3.  $4 + 7$

\_\_\_\_\_

Evaluate  $-2 + x$  for each value of  $x$ .

4. 5

\_\_\_\_\_

5.  $-2$

\_\_\_\_\_

6.  $-7$

\_\_\_\_\_

Find each difference.

7.  $1 - 9$

\_\_\_\_\_

8.  $-5 - 6$

\_\_\_\_\_

9.  $8 - (-4)$

\_\_\_\_\_

Evaluate  $a - (-5)$  for each value of  $a$ .

10.  $-3$

\_\_\_\_\_

11. 2

\_\_\_\_\_

12.  $-7$

\_\_\_\_\_

Find each product.

13.  $0 \cdot 12$

\_\_\_\_\_

14.  $-6 \cdot 3$

\_\_\_\_\_

15.  $-4 \cdot -7$

\_\_\_\_\_

Evaluate  $-6m$  for each value of  $m$ .

16.  $-1$

\_\_\_\_\_

17. 5

\_\_\_\_\_

18.  $-6$

\_\_\_\_\_

Divide.

19.  $\frac{36}{-4}$

\_\_\_\_\_

20.  $-8 \div -2$

\_\_\_\_\_

21.  $-56 \div 7$

\_\_\_\_\_

Solve each equation.

22.  $x - 13 = -5$

\_\_\_\_\_

23.  $15 + a = 4$

\_\_\_\_\_

24.  $\frac{w}{-3} = 6$

\_\_\_\_\_

Answers: 1.  $-5$ , 2.  $0$ , 3.  $11$ , 4.  $3$ , 5.  $-4$ , 6.  $-9$ , 7.  $-8$ , 8.  $-11$ , 9.  $12$ , 10.  $2$ , 11.  $7$ , 12.  $-2$ , 13.  $0$ , 14.  $-18$ , 15.  $28$ , 16.  $6$ , 17.  $-30$ , 18.  $36$ , 19.  $-9$ , 20.  $4$ , 21.  $-8$ , 22.  $x = 8$ , 23.  $a = -11$ , 24.  $w = -18$

CHAPTER

**11**

**Family Fun**

**Integer Fill In**

**Directions**

- Try to fill in the missing numbers.
- The missing numbers are integers between  $-100$  and  $100$ .
- The numbers in each row add up to the total in the right column.
- The numbers in each column add up to the total along the bottom row.
- The diagonal lines add up to the total in the upper right and lower right cells.

-158

	15	-74	-55	54		-54		-47	-52	-293
-28	97	-29		83	-73	-30	62	-4		24
					14	35			93	-43
		-62	-96		11		-75	-60		-299
3	-15	42	-84	-12	89	-29		-10	-41	-92
8	-6	-3		81		91	93	34		331
	-23		-36	-6	99		-94		13	-168
92	-15		3	-29	86		66	76	86	411
-49	-76		-16	29	-73	23	22	-28		-110
-42	-99	-86	31	75	77	-48	-59		-50	-230
-83	-43	-241	-279	231	84	-129	-131	-35	157	-181

-181	157	-35	-131	-129	84	231	-279	-241	-43	-83
-230	-50	-29	-59	-48	77	75	31	-86	-99	-42
-110	-2	-28	22	23	-73	29	-16	60	-76	-49
411	86	76	66	17	86	-29	3	29	-15	92
-168	13	-36	-94	-53	99	-6	-36	-32	-23	0
331	25	34	93	91	-65	81	73	-3	-6	8
-92	-41	-10	-35	-29	89	-12	-84	42	-15	3
-299	98	-60	-75	-81	11	14	-96	-62	40	-88
-43	93	69	-66	35	14	-58	-58	-86	39	-25
24	-13	-4	62	-30	-73	83	-41	-29	97	-28
-293	-52	-47	-45	-54	-81	54	-55	-74	15	46
-158										

**Answer:**

## What We Are Learning

## Functions and Equations

## Vocabulary

These are the math words we are learning:

**function** a rule that relates two quantities so that each input value corresponds exactly to one output value

**input** a value substituted into a function to get an output

**linear equation** an equation whose graph is a straight line

**output** a result of a function after the input value is placed in the function

*Dear Family,*

Your child will be learning about **functions** and how to write equations for a function. A function is simply just a rule for a pattern. It relates two quantities so that each **input** value corresponds *exactly* to only *one* **output** value.

You can use a function table to show some of the values for the function, as shown in this example.

**Write an equation for the function that gives the values in the table. Use the equation to find the value of  $y$  for the indicated value of  $x$ .**

$x$	5	6	7	8	9	10
$y$	13	15	17	19	21	■

$y$  is 2 times  $x + 3$ .

Compare  $x$  and  $y$  to find a pattern.

$$y = 2x + 3$$

Use the pattern to write an equation.

$$y = 2(10) + 3$$

Substitute 10 for  $x$ .

$$y = 20 + 3$$

Multiply.

$$y = 23$$

Use your function rule to find  $y$  when  $x = 10$ .

When  $x$  is 10,  $y$  is 23.

Another important part of this section is learning how to translate words into math expressions.

**Write the equation for the function. Tell what each variable you use represents.**

The height of a triangle is 6 less than the length of the base.

$h$  = height of the triangle

Choose variables for the equation.

$b$  = length of the base.

$$h = b - 6$$

Write an equation.

As an introduction to functions, your child will learn about linear functions; a function represented by a straight line. She or he will learn to use ordered pairs and graphs to identify and represent various linear functions.

**Use the given  $x$ -values to write solutions of the equation as ordered pairs. Then, graph the function described by the equation.**

$$y = 4x + 5 \text{ for } x = 1, 2, 3, 4$$

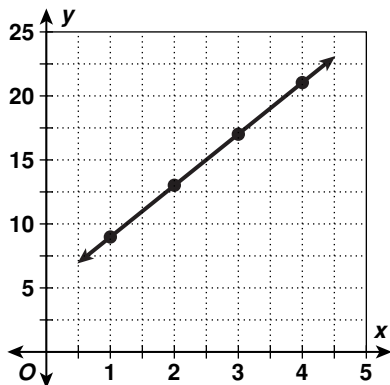
Make a function table by using the given values for  $x$  to find values for  $y$ .

$x$	$4x + 5$	$y$
1	$4(1) + 5$	9
2	$4(2) + 5$	13
3	$4(3) + 5$	17
4	$4(4) + 5$	21

Write these solutions as ordered pairs.

$(x, y)$   
 $(1, 9)$   
 $(2, 13)$   
 $(3, 17)$   
 $(4, 21)$

Graph the ordered pairs on a coordinate plane.



Draw a line through the points to represent all the values of  $x$  you could have chosen and the corresponding values of  $y$ .

Your child will also determine if an ordered pair is a solution of an equation by substituting the ordered pair into the equation to see if the values make the equation true.

While this is just an introduction to linear functions and equations, your child will continue to build upon the information learned in this section throughout future math courses.

**Sincerely,**

**CHAPTER 11** **Family Letter**  
**11** *Functions and Equations*

Write an equation for a function that gives the values in each table. Use the equation to find the value of  $y$  for the indicated  $x$ .

1. 

$x$	2	3	4	5	6	10
$y$	3	5	7	9	11	■

 \_\_\_\_\_

2. 

$x$	2	3	5	7	12
$y$	8	9	11	13	■

 \_\_\_\_\_

Write an equation for the function. Tell what each variable you use represents.

3. Mark works at the market. For each hour he works, Mark gets paid \$6.50.  
\_\_\_\_\_

4. Haley is five years older than Emma.  
\_\_\_\_\_

Use the given  $x$ -values to write solutions of each equation as ordered pairs.

5.  $y = 3x - 2$  for  $x = 1, 2, 3, 4$   
\_\_\_\_\_

6.  $y = -6x + 4$  for  $x = 1, 2, 3, 4$   
\_\_\_\_\_

Determine whether each ordered pair is a solution of the given equation.

7.  $(2, 5)$ ;  $y = 6x - 5$   
\_\_\_\_\_

8.  $(-4, 1)$ ;  $y = x + 5$   
\_\_\_\_\_

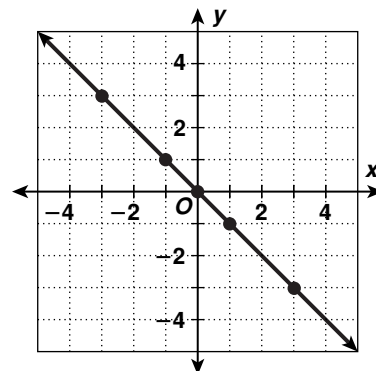
Use the graph of the linear function to find the value of  $y$  for each given value of  $x$ .

9.  $x = -3$   
\_\_\_\_\_

10.  $x = 0$   
\_\_\_\_\_

11.  $x = 1$   
\_\_\_\_\_

12.  $x = 3$   
\_\_\_\_\_



**Answers:** 1.  $y = 2x - 1$ ;  $y = 19$  2.  $y = x + 6$ ;  $y = 18$  3.  $x =$  number of hours worked;  $y =$  Mark's paycheck;  $y = 6.50x$  4.  $x =$  Emma's age;  $y =$  Haley's age;  $y = x + 5$  5.  $(1, 1)$ ;  $(2, 4)$ ;  $(3, 7)$ ;  $(4, 10)$  6.  $(1, -2)$ ;  $(2, -8)$ ;  $(3, -14)$ ;  $(4, -20)$  7. No;  $5 \neq 6(2) - 5$ ;  $5 \neq 7$  8. Yes;  $1 = -4 + 5$ ;  $1 = 1$  9.  $y = 3$  10.  $y = 0$  11.  $y = -1$  12.  $y = -3$

**Family Letter****Function Fun****Directions**

- Cut out the cards and place them face down in rows and columns.
- Take turns with a partner uncovering 2 cards at a time.
- The first card is the  $x$ -value and the second card is the  $y$ -value.
- Substitute these values into the equation  $y = -6x + 5$ . If the values are a solution to the equation, you have a match. If the values are not a solution to the equation, turn the cards over and let the other player have a turn.
- The first player to find 3 matches is the winner.

5	1	-1	-1
-2	17	2	-7
29	4	-19	3
-3	23	$\frac{1}{2}$	2
0	6	-4	-13