CHAPTER 2 STUDY GUIDE

NAME _____ DATE _____ PERIOD _____

2-1 Study Guide and Intervention

Integers and Absolute Value

Compare and Order Integers The set of **integers** can be written {..., −3, −2, −1, 0, 1, 2, 3, ...} where ... means *continues indefinitely*. Two integers can be compared using an **inequality**, which is a mathematical sentence containing < or >.

Example 1 **Write an integer for each situation.**

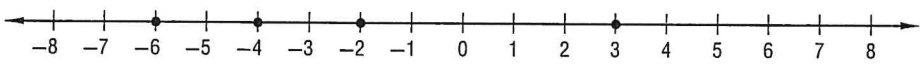
a. 16 feet below the surface

The integer is −16.

b. 5 strokes over par

The integer is +5 or 5.

Example 2 **Use the integers graphed on the number line below.**



Replace each ● with < or > to make a true sentence.

a. **−6 ● −2**

−2 is greater since it lies to the right of −6.
So write −6 < −2.

b. **3 ● −4**

3 is greater since it lies to the right of −4.
So write 3 > −4.

Exercises

Write an integer for each situation.

1. 2 inches less than normal
2. 13°F above average
3. a deposit of $50
4. a loss of 8 yards

Replace each ● with <, >, or = to make a true sentence.

5. 4 ● −4
6. 8 ● 12
7. −7 ● −5
8. 2 ● 5
9. −1 ● 1
10. 4 ● −3
11. 6 ● 8
12. −2 ● 12
13. 9 ● −1
14. −6 ● −6
15. 5 ● −3
16. −10 ● 2

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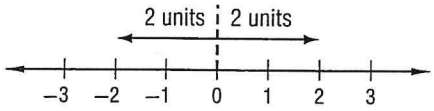
NAME _____ DATE _____ PERIOD _____

2-1 Study Guide and Intervention *(continued)*

Integers and Absolute Value

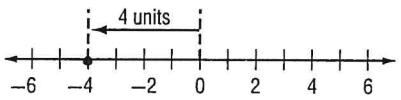
Absolute Value Numbers on opposite sides of zero and the same distance from zero have the same **absolute value**.



The symbol for absolute value is two vertical bars on either side of the number. $|2| = 2$ and $|-2| = 2$

Example 1 **Evaluate each expression.**

a. $|-4|$



$|-4| = 4$ On the number line, −4 is 4 units from 0.

b. $|-3| + |6|$

$|-3| + |6| = 3 + 6$ $|-3| = 3, |6| = 6$

$= 9$ Simplify.

Example 2 **Evaluate $|x| - 7$ if $x = -8$.**

$|x| - 7 = |-8| - 7$ Replace x with −8.

$= 8 - 7$ The absolute value of −8 is 8.

$= 1$ Simplify.

Exercises

Evaluate each expression.

1. $|-6|$
2. $|15|$
3. $|-12|$
4. $|21|$
5. $|4| - |2|$
6. $|-8| + |-3|$
7. $|-10| - |-6|$
8. $|12| + |-4|$

ALGEBRA Evaluate each expression if $x = 8$ and $y = -3$.

9. $12 + |y|$
10. $x - |y|$
11. $2|x| + 3|y|$
12. $x + |y|$
13. $6|y|$
14. $3x - 4|y|$

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NAME _____ DATE _____ PERIOD _____

2-2 Study Guide and Intervention

Adding Integers

Adding Integers with the Same Sign	Add their absolute values. The sum is: • positive if both integers are positive. • negative if both integers are negative.

Example 1 **Find the sum $-3 + (-4)$.**

$-3 + (-4) = -7$ Add $|-3|$ and $|-4|$. The sum is negative.

Adding Integers with Different Signs	Subtract their absolute values. The sum is: • positive if the positive integer's absolute value is greater. • negative if the negative integer's absolute value is greater.

Example 2 **Find each sum.**

a. $-5 + 4$

$-5 + 4 = |-5| - |4|$ Subtract $|4|$ from $|-5|$.

$= 5 - 4$ or 1 Simplify.

$= -1$ The sum is negative because $|-5| > |4|$.

b. $6 + (-2)$

$6 + (-2) = |6| - |-2|$ Subtract $|-2|$ from $|6|$.

$= 6 - 2$ or 4 Simplify.

$= 4$ The sum is positive because $|6| > |-2|$.

Exercises

Find each sum.

1. $6 + (-3)$
2. $-3 + (-5)$
3. $7 + (-3)$
4. $-4 + (-4)$
5. $-8 + 5$
6. $-12 + (-10)$
7. $6 + (-13)$
8. $-14 + 4$
9. $6 + (-6)$
10. $-15 + (-5)$
11. $-9 + 8$
12. $20 + (-8)$
13. $-19 + (-11)$
14. $17 + (-9)$
15. $-16 + (-5)$
16. $-12 + 14$
17. $9 + (-25)$
18. $-36 + 19$
19. $7 + (-18)$
20. $-12 + (-15)$
21. $10 + (-14)$
22. $-33 + 19$
23. $-20 + (-5)$
24. $-12 + (-10)$
25. $-15 + 4$
26. $-34 + 29$
27. $46 + (-32)$

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2-2 Study Guide and Intervention *(continued)*

Adding Integers

Add More Than Two Integers Two numbers with the same absolute value but different signs are **opposites**. An integer and its opposite are also called **additive inverses**. This property is useful when adding 2 or more integers.

Additive Inverse Property

Words	The sum of any number and its additive inverse is zero.
Example	$5 + (-5) = 0$
Symbols	$a + (-a) = 0$

Example **Find each sum.**

a. $-7 + (-16) + 7$

$-7 + (-16) + 7 = -7 + 7 + (-16)$ Commutative Property

$= 0 + (-16)$ Additive Inverse Property

$= -16$ Identity Property of Addition

b. $12 + (-4) + 9 + (-7)$

$12 + (-4) + 9 + (-7) = 12 + 9 + (-4) + (-7)$ Commutative Property

$= (12 + 9) + [-4 + (-7)]$ Associative Property

$= 21 + (-11)$ or 10 Simplify.

Exercises

Find each sum.

1. $2 + 14 + (-2)$
2. $-8 + (-7) + 8$
3. $-13 + 11 + (-4)$
4. $7 + (-5) + (-6)$
5. $15 + 14 + (-12)$
6. $-9 + 17 + (-3)$
7. $24 + (-5) + 3$
8. $54 + 39 + (-54)$
9. $-42 + 20 + (-8)$
10. $-11 + (-6) + 22$
11. $35 + (-43) + (-4)$
12. $-100 + 50 + (-25)$
13. $6 + (-14) + (-5) + (-6)$
14. $-18 + 9 + (-7) + 18$
15. $5 + 13 + (-11) + 6$
16. $-20 + 15 + (-10) + 3$
17. $-33 + (-7) + 20 + 9$
18. $16 + (-12) + 21 + (-25)$

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2-3 Study Guide and Intervention

Subtracting Integers

Subtracting Integers	To subtract an integer, add its additive inverse.

Example 1 **Find each difference.**

a. 9 − 17

$9 - 17 = 9 + (-17)$ To subtract 17, add −17.
$= -8$ Simplify.

b. −7 − 3

$-7 - 3 = -7 + (-3)$ To subtract 3, add −3.
$= -10$ Simplify.

Example 2 **Find each difference.**

a. 4 − (−5)

$4 - (-5) = 4 + 5$ To subtract −5, add +5.
$= 9$ Simplify.

b. −6 − (−2)

$-6 - (-2) = -6 + 2$ To subtract −2, add +2.
$= -4$ Simplify.

Exercises

Find each difference.

1. 9 − 16
2. 7 − 19
3. 12 − 21
4. −5 − 3
5. −8 − 9
6. −13 − 17
7. 7 − (−4)
8. 9 − (−9)
9. −11 − (−2)
10. −6 − (−9)
11. −6 − 4
12. −16 − (−20)
13. −14 − 4
14. 8 − (−6)
15. −10 − (−6)
16. 13 − (−17)
17. 24 − (−16)
18. 17 − (−9)
19. −24 − 8
20. 18 − (−9)
21. 26 − 49
22. −45 − (−26)
23. −15 − (−25)
24. 29 − (−6)

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2-4 Study Guide and Intervention

Multiplying Integers

Multiplying Integers with Different Signs	The product of two integers with different signs is negative.

Example 1 **Find each product.**

a. $4(-3)$

$4(-3) = -12$

b. $-8(5)$

$-8(5) = -40$

Multiplying Integers with the Same Sign	The product of two integers with the same sign is positive.

Example 2 **Find each product.**

a. $6(6)$

$6(6) = 36$

b. $-7(-4)$

$-7(-4) = 28$

Example 3 **Find $6(-3)(-2)$.**

$6(-3)(-2) = [6(-3)](-2)$ Use the Associative Property.

$= -18(-2)$ $6(-3) = -18$

$= 36$ $-18(-2) = 36$

Exercises

Find each product.

1. $-5(7)$
2. $6(-9)$
3. $-10 \cdot 4$
4. $-12 \cdot -2$
5. $5(-11)$
6. $-15(-4)$
7. $-14(2)$
8. $6(14)$
9. $-18 \cdot 2$
10. $-9(10)$
11. $12(-6)$
12. $-11(-11)$
13. $-4(-4)(5)$
14. $6(-7)(2)$
15. $-10(-4)(-6)$
16. $-7(-3)(2)$
17. $-9(4)(2)$
18. $6(-4)(-12)$
19. $11(3)(-2)$
20. $-5(-6)(7)$
21. $-3(-4)(-8)$
22. $22(3)(-3)$
23. $-8(10)(-2)$
24. $-6(5)(-9)$

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2-4 Study Guide and Intervention *(continued)*

Multiplying Integers

Algebraic Expressions Use the rules for multiplying integers to simplify and evaluate algebraic expressions.

Example 1 **Simplify $-3a(-12b)$.**

$-3a(-12b) = (-3)(a)(-12)(b)$ $-3a = (-3)(a)$, $-12b = (-12)(b)$

$= (-3 \cdot -12)(a \cdot b)$ Commutative Property of Multiplication

$= 36ab$ $-3 \cdot -12 = 36$, $a \cdot b = ab$

Example 2 **Evaluate $4xy$ if $x = 3$ and $y = -5$.**

$4xy = 4(3)(-5)$ Replace x with 3, and y with -5.

$= [4(3)](-5)$ Associative Property of Multiplication

$= 12(-5)$ The product of 4 and 3 is positive.

$= -60$ The product of 12 and -5 is negative.

Exercises

ALGEBRA Simplify each expression.

1. $9(-3w)$
2. $2e \cdot 9f$
3. $-8 \cdot 7m$
4. $-4s(-7)$
5. $10p(-5q)$
6. $n \cdot 6 \cdot 8$
7. $-3a(15b)$
8. $-9x \cdot (-4y)$
9. $-c \cdot 11d$

ALGEBRA Evaluate each expression if $x = -4$ and $y = 8$.

10. $4x$
11. $3y$
12. $-12x$
13. $-6y$
14. xy
15. $-xy$
16. $-2xy$
17. $5xy$
18. $-3x(-y)$

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2-5 Study Guide and Intervention

Dividing Integers

Dividing Integers with the Same Sign	The quotient of two integers with the same sign is positive.

Example 1 **Find each quotient.**

a. $14 \div 2$

The dividend and the divisor have the same sign.

$14 \div 2 = 7$ The quotient is positive.

b. $\frac{-25}{-5}$

$\frac{-25}{-5} = -25 \div (-5)$ The dividend and divisor have the same sign.

$= 5$ The quotient is positive.

Dividing Integers with Different Signs	The quotient of two integers with different signs is negative.

Example 2 **Find each quotient.**

a. $36 \div (-4)$ The signs are different.

$36 \div (-4) = -9$ The quotient is negative.

b. $-\frac{42}{6}$ The signs are different.

$-\frac{42}{6} = -7$ The quotient is negative.

Exercises

Find each quotient.

1. $32 \div (-4)$
2. $-18 \div (-2)$
3. $-24 \div 6$
4. $-36 \div (-2)$
5. $50 \div (-5)$
6. $-81 \div (-9)$
7. $-72 \div (-2)$
8. $-45 \div 3$
9. $-60 \div (-12)$
10. $99 \div (-11)$
11. $-200 \div (-4)$
12. $38 \div (-2)$
13. $-144 \div 12$
14. $100 \div (-5)$
15. $-200 \div (-20)$
16. $\frac{-28}{2}$
17. $\frac{36}{-4}$
18. $\frac{-150}{-25}$

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2-5 Study Guide and Intervention *(continued)*

Dividing Integers

Mean (Average) To find the **mean,** or average, of a set of numbers, find the sum of the numbers and then divide by the number of items in the set. Use the rules for dividing integers to find the mean.

Example **OCEANOGRAPHY The diving depths in feet of 7 scuba divers studying schools of fish were −12, −9, −15, −8, −20, −17, and −10. Find the mean diving depth.**

$$\frac{-12 + (-9) + (-15) + (-8) + (-20) + (-17) + (-10)}{7} = \frac{-91}{7}$$ Find the sum of the diving depths. Divide by the number of divers.

$$= -13$$ Simplify.

The mean diving depth is −13 feet, or 13 feet below sea level.

Exercises

1. **WEATHER** The low temperatures in degrees Fahrenheit for a week were −3, 5, −9, 2, 6, −11, and −4. Find the mean temperature.

2. **MONEY** The last 6 entries in Ms. Caudle's checkbook ledger show both deposits and withdrawals. Ms. Caudle wrote down $100, −$20, −$35, $250, −$150, and −$85. What is the mean dollar amount for these entries?

3. **GOLF** During 5 rounds of golf, James had scores of 2, −1, 0, −2, and −4. Find the mean of his golf scores.

4. **TRAINING** To train himself for a motivation, josh runs every day. Last week he ran 3 miles, 7 miles, 3 miles, 4 miles, 7 miles, 10 miles and 5 miles. What is the mean number of miles he ran last week?

5. **ROCK CLIMBING** A rock climber makes several changes in position while attempting to scale a cliff face. She ascends 15 feet, descends 7 feet, ascends 22 feet, descends 13 feet, and then ascends another 28 feet. What is her mean change in position?

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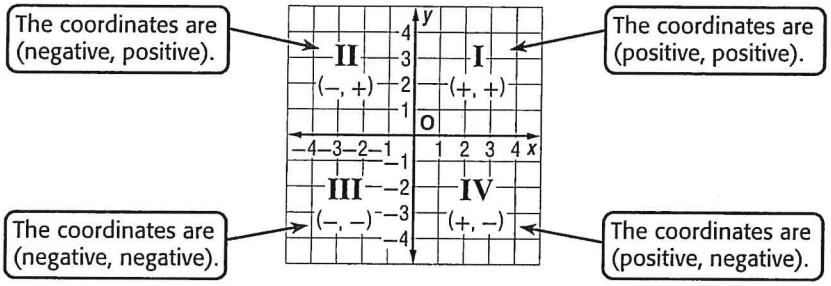
2-6 Study Guide and Intervention

Graphing in Four Quadrants



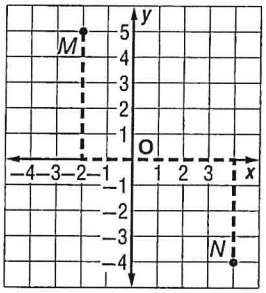
Example **Graph and label each point on a coordinate plane. Name the quadrant in which each point lies.**

a. $M(-2, 5)$

Start at the origin. Move 2 units left. Then move 5 units up and draw a dot. Point $M(-2, 5)$ is in Quadrant II.

b. $N(4, -4)$

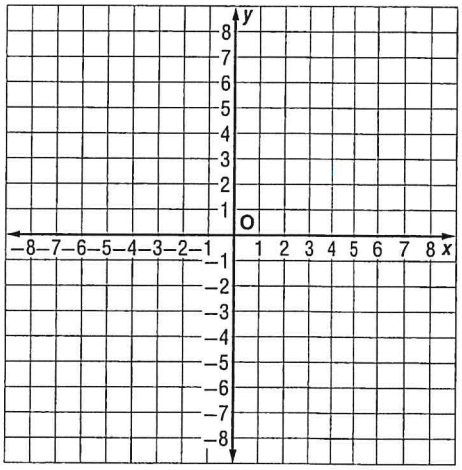
Start at the origin. Move 4 units right. Then move 4 units down and draw a dot. Point $N(4, -4)$ is in Quadrant IV.



Exercises

Graph and label each point on the coordinate plane. Name the quadrant in which each point is located.

1. $A(2, 6)$
2. $B(-1, 4)$
3. $C(0, -5)$
4. $D(-4, -3)$
5. $E(2, 0)$
6. $F(3, -2)$
7. $G(-4, 4)$
8. $H(2, -5)$
9. $I(6, 3)$
10. $J(-5, -8)$
11. $K(3, -5)$
12. $L(-7, -3)$



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