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Simplify the expression. Explain each step.

1. $2 + (5 + y)$

2. $(c + 1) + 9$

3. $(2.3 + n) + 1.4$

4. $7 + (d + 5)$

5. $10(7t)$

6. $8(4k)$

Big Ideas Math Red **1**
Record and Practice Journal

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7. $13 \cdot 0 \cdot p$

8. $7 \cdot z \cdot 0$

9. $2.5 \cdot w \cdot 1$

10. $1 \cdot x \cdot 19$

11. $(t + 3) + 0$

12. $0 + (g + 4)$

Name_____ Date _____

1.1 Integers and Absolute Value
For use with Activity 1.1

Essential Question How can you use integers to represent the velocity and the speed of an object?

On these three pages, you will investigate vertical motion (up or down).

- Speed tells how fast an object is moving, but it does not tell the direction.

- Velocity tells how fast an object is moving, and it also tells the direction.

  When velocity is positive, the object is moving up.

  When velocity if negative, the object is moving down.

1 ACTIVITY: Falling Parachute

Work with a partner. You are gliding to the ground wearing a parachute. The table shows your height above the ground at different times.

Time (seconds)	0	1	2	3
Height (feet)	90	75	60	45

a. Describe the pattern in the table. How many feet do you move each second? After how many seconds will you land on the ground?

b. What integer represents your speed? Give the units.

c. Do you think your velocity should be represented by a positive or negative integer? Explain your reasoning.

d. What integer represents your velocity? Give the units.

Name _____ Date _____

2 **ACTIVITY:** Rising Balloons

Work with a partner. You release a group of balloons. The table shows the height of the balloons above the ground at different times.

Time (seconds)	0	1	2	3
Height (feet)	8	12	16	20

a. Describe the pattern in the table. How many feet do the balloons move each second? After how many seconds will the balloons be at a height of 40 feet?

b. What integer represents the speed of the balloons? Give the units.

c. Do you think the velocity of the balloons should be represented by a positive or negative integer? Explain your reasoning.

d. What integer represents the velocity of the balloons? Give the units.

3 **ACTIVITY:** Firework Parachute

Work with a partner. The table shows the height of a firework's parachute above the ground at different times.

Time (seconds)	Height (feet)
0	480
1	360
2	240
3	120
4	0

a. Describe the pattern in the table. How many feet does the parachute move each second?

b. What integer represents the speed of the parachute? What integer represents the velocity? How are these integers similar in their relation to 0 on a number line?

1.1 **Integers and Absolute Value** (continued)

Inductive Reasoning

4. Complete the table.

Velocity (feet per second)	−14	20	−2	0	25	−15
Speed (feet per second)						

5. Find two different velocities for which the speed is 16 feet per second.

6. Which number is greater: −4 or 3? Use a number line to explain your reasoning.

7. One object has a velocity of −4 feet per second. Another object has a velocity of 3 feet per second. Which object has the greater speed? Explain your answer.

8. **IN YOUR OWN WORDS** How can you use integers to represent the velocity and the speed of an object?

What Is Your Answer?

9. **LOGIC** In this lesson, you will study **absolute value**. Here are some examples:

Absolute value of $|-16| = 16$ Absolute value of $|16| = 16$

Absolute value of $|0| = 0$ Absolute value of $|-2| = 2$

Which of the following is a true statement? Explain your reasoning.

$$|\text{velocity}| = \text{speed}$$ $$|\text{speed}| = \text{velocity}$$

Name _____ Date _____

1.1 Practice
For use after Lesson 1.1

Find the absolute value.

1. $|-1|$

2. $|-14|$

3. $|0|$

4. $|6|$

Complete the statement using <, >, or =.

5. 6 ___ $|-2|$

6. -7 ___ $|-8|$

7. $|-9|$ ___ 5

8. $|-2|$ ___ 2

Order the values from least to greatest.

9. $4,\ |7|,\ -1,\ |-3|,\ -4$

10. $|2|,\ -3,\ |-5|,\ -1,\ 6$

11. You download 12 new songs to your MP3 player. Then you delete 5 old songs. Write each amount as an integer.

Name_____ Date_____

1.2 Adding Integers
For use with Activity 1.2

Essential Question Is the sum of two integers *positive*, *negative*, or *zero*? How can you tell?

1 ACTIVITY: Adding Integers with the Same Sign

Work with a partner. Draw a picture to show how you use integer counters to find $-4 + (-3)$.

$-4 + (-3) =$ _____

2 ACTIVITY: Adding Integers with Different Signs

Work with a partner. Draw a picture to show how you use integer counters to find $-3 + 2$.

$-3 + 2 =$ _____

3 ACTIVITY: Adding Integers with Different Signs

Work with a partner. Show how to use a number line to find $5 + (-3)$.

$5 + (-3) =$ _____

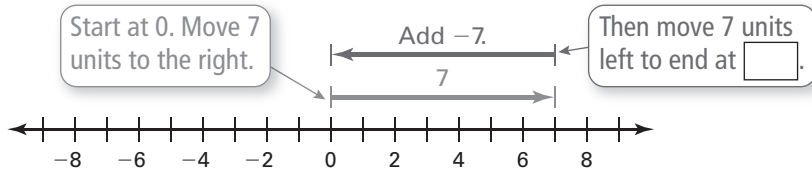**1.2** **Adding Integers** (continued)

4 **ACTIVITY:** Adding Integers with Different Signs

Work with a partner. Write the addition expression shown. Then find the sum. How are the integers in the expression related to 0 on a number line?

Start at 0. Move 7 units to the right.

Add −7.

7

Then move 7 units left to end at [ ].

−8   −6   −4   −2   0   2   4   6   8

Inductive Reasoning

Work with a partner. Use integer counters or a number line to complete the table.

Exercise	Type of Sum	Sum	Sum: Positive, Negative, or Zero
1 **5.** −4 + (−3)			
2 **6.** −3 + 2			
3 **7.** 5 + (−3)			
4 **8.** 7 + (−7)			
9. 2 + 4			
10. −6 + (−2)			
11. −5 + 9			
12. 15 + (−9)			
13. −10 + 10			
14. −6 + (−6)			
15. 13 + (−13)			

1.2 **Adding Integers** (continued)

What Is Your Answer?

16. IN YOUR OWN WORDS Is the sum of two integers *positive*, *negative*, or *zero*? How can you tell?

17. STRUCTURE Write a general rule for adding

  a. two integers with the same sign.

  b. two integers with different signs.

  c. two integers that vary in sign.

Name _____ Date _____

Add.

1. $-9 + 2$

2. $5 + (-5)$

3. $-12 + (-6)$

4. $-10 + 19 + 5$

5. $-11 + (-20) + 9$

6. $-7 + 7 + (-8)$

Use mental math to solve the equation.

7. $x + (-5) = 4$

8. $y + 6 = -2$

9. $-10 = -7 + z$

10. The table shows the change in your hair length over a year.

Month	January	February	August	September	December
Change in hair length (inches)	2	−1	3	−4	3

  a. What is the total change in your hair length at the end of the year?

  b. Is your hair longer in January or December? Explain your reasoning.

  c. When is your hair the longest? Explain your reasoning.

Name_____ Date _____

1.3 Subtracting Integers
For use with Activity 1.3

Essential Question How are adding integers and subtracting integers related?

1 ACTIVITY: Subtracting Integers

Work with a partner. Draw a picture to show how you use integer counters to find $4 - 2$.

$4 - 2 =$ _____

2 ACTIVITY: Adding Integers

Work with a partner. Draw a picture to show how you use integer counters to find $4 + (-2)$.

$4 + (-2) =$ _____

3 ACTIVITY: Subtracting Integers

Work with a partner. Show how to use a number line to find $-3 - 1$.

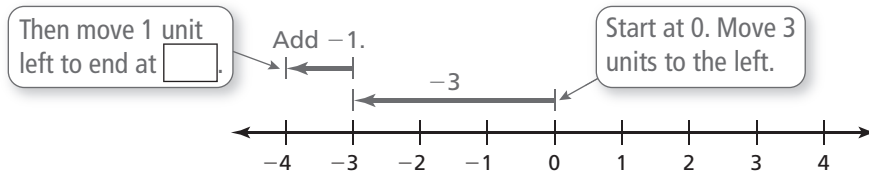$-3 - 1 =$ _____

1.3 **Subtracting Integers** (continued)

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4 **ACTIVITY:** Adding Integers

Work with a partner. Write the addition expression shown. Then find the sum.

| Then move 1 unit left to end at ☐. | Add −1. | | Start at 0. Move 3 units to the left. |

−3

−4 −3 −2 −1 0 1 2 3 4

Inductive Reasoning

Work with a partner. Use integer counters or a number line to complete the table.

	Exercise	Operation: Add or Subtract	Answer
1	**5.** $4 - 2$		
2	**6.** $4 + (-2)$		
3	**7.** $-3 - 1$		
4	**8.** $-3 + (-1)$		
	9. $3 - 8$		
	10. $3 + (-8)$		
	11. $9 - 13$		
	12. $9 + (-13)$		
	13. $-6 - (-3)$		
	14. $-6 + 3$		
	15. $-5 - (-12)$		
	16. $-5 + 12$		

1.3 **Subtracting Integers** (continued)

What Is Your Answer?

17. **IN YOUR OWN WORDS** How are adding integers and subtracting integers related?

18. **STRUCTURE** Write a general rule for subtracting integers.

19. Use a number line to find the value of the expression $-4 + 4 - 9$. What property can you use to make your calculation easier? Explain.

Name _____ Date _____

1.3 Practice
For use after Lesson 1.3

Subtract.

1. $3 - 8$ **2.** $6 - (-7)$ **3.** $-10 - 9$ **4.** $-5 - (-4)$

Evaluate the expression.

5. $11 - (-2) + 14$ **6.** $-16 - (-12) + (-8)$ **7.** $6 - 17 - 4$

Use mental math to solve the equation.

8. $6 - x = 10$ **9.** $y - (-10) = 2$ **10.** $z - 17 = -14$

11. You begin a hike in Death Valley, California, at an elevation of -86 meters. You hike to a point of elevation at 45 meters. What is your change in elevation?

12. You sell T-shirts for a fundraiser. It costs $112 to have the T-shirts made. You make $98 in sales. What is your profit?

Name_____ Date _____

1.4 Multiplying Integers
For use with Activity 1.4

Essential Question   Is the product of two integers *positive*, *negative*, or *zero*? How can you tell?

---

1   ACTIVITY: Multiplying Integers with the Same Sign

Work with a partner. Use repeated addition to find 3 • 2.

Recall that multiplication is repeated addition. 3 • 2 means to add 3 groups of 2.

$3 \bullet 2 =$ _____

---

2   ACTIVITY: Multiplying Integers with Different Signs

Work with a partner. Use repeated addition to find $3 \bullet (-2)$.

$3 \bullet (-2) =$ _____

---

3   ACTIVITY: Multiplying Integers with Different Signs

Work with a partner. Use a table to find −3 • 2.

Describe the pattern of the products in the table. Then complete the table.

2	•	2	=
1	•	2	=
0	•	2	=
−1	•	2	=
−2	•	2	=
−3	•	2	=

$-3 \bullet 2 =$ _____

Name _____ Date _____

4 **ACTIVITY:** Multiplying Integers with the Same Sign

Work with a partner. Use a table to find −3 • (−2).

Describe the pattern of the products in the table. Then complete the table.

−3	•	3	=
−3	•	2	=
−3	•	1	=
−3	•	0	=
−3	•	−1	=
−3	•	−2	=

−3 • (−2) = _____

Inductive Reasoning

Work with a partner. Complete the table.

	Exercise	Type of Product	Product	Product: Positive or Negative
1	**5.** 3 • 2			
2	**6.** 3 • (−2)			
3	**7.** −3 • 2			
4	**8.** −3 • (−2)			
	9. 6 • 3			
	10. 2 • (−5)			
	11. −6 • 5			
	12. −5 • (−3)			

1.4 **Multiplying Integers** (continued)

What Is Your Answer?

13. Write two integers whose product is 0.

14. **IN YOUR OWN WORDS** Is the product of two integers *positive*, *negative*, or *zero*? How can you tell?

15. **STRUCTURE** Write a general rule for multiplying

   a. two integers with the same sign.

   b. two integers with different signs.

Name _____ Date _____

Multiply.

1. $8 \bullet 9$

2. $7(-7)$

3. $-10 \bullet 4$

4. $-5(-6)$

5. $12 \bullet (-1) \bullet (-2)$

6. $-10(-3)(-7)$

7. $-20 \bullet 0 \bullet (-4)$

8. $-4 \bullet 8 \bullet 3$

Evaluate the expression.

9. $(-8)^2$

10. -11^2

11. $9 \bullet (-5)^2$

12. $(-2)^3 \bullet (-6)$

13. You lose 5 points for every wrong answer in a trivia game. What integer represents the change in your points after answering 8 questions wrong?

Name_____ Date_____

Dividing Integers
For use with Activity 1.5

Essential Question   Is the quotient of two integers *positive*, *negative*, or *zero*? How can you tell?

1 ACTIVITY: Dividing Integers with Different Signs

Work with a partner. Draw a picture to show how you use integer counters to find $-15 \div 3$.

$-15 \div 3 = $ _____

2 ACTIVITY: Rewriting a Product as a Quotient

Work with a partner. Rewrite the product $3 \bullet 4 = 12$ as a quotient in two different ways.

First Way   *Second Way*

12 is equal to 3 groups of _____.   12 is equal to 4 groups of _____.

$12 \div 3 = $ _____ $12 \div 4 = $ _____

3 ACTIVITY: Dividing Integers with Different Signs

Work with a partner. Rewrite the product $-3 \bullet (-4) = 12$ as a quotient in two different ways. What can you conclude?

First Way   *Second Way*

1.5 **Dividing Integers** (continued)

4 **ACTIVITY:** Dividing Negative Integers

Work with a partner. Rewrite the product $3 \bullet (-4) = -12$ as a quotient in two different ways. What can you conclude?

First Way   *Second Way*

Inductive Reasoning

Work with a partner. Complete the table.

	Exercise	Type of Quotient	Quotient	Quotient: Positive, Negative, or Zero
1	**5.** $-15 \div 3$			
2	**6.** $12 \div 4$			
3	**7.** $12 \div (-3)$			
4	**8.** $-12 \div (-4)$			
	9. $-6 \div 2$			
	10. $-21 \div (-7)$			
	11. $10 \div (-2)$			
	12. $12 \div (-6)$			
	13. $0 \div (-15)$			
	14. $0 \div 4$			

1.5 **Dividing Integers** (continued)

What Is Your Answer?

15. **IN YOUR OWN WORDS** Is the quotient of two integers *positive*, *negative*, or *zero*? How can you tell?

16. **STRUCTURE** Write a general rule for dividing

    a. two integers with the same sign.

    b. two integers with different signs.

Name _____ Date _____

1.5 Practice
For use after Lesson 1.5

Divide, if possible.

1. $3 \div (-1)$

2. $8 \div 2$

3. $-10 \div 5$

4. $-21 \div (-7)$

5. $\dfrac{48}{-6}$

6. $\dfrac{-13}{-13}$

7. $\dfrac{0}{3}$

8. $\dfrac{-55}{11}$

Evaluate the expression.

9. $-63 \div (-7) + 6$

10. $-5 - 12 \div 3$

11. $-8 \bullet 7 + 33 \div (-11)$

12. The table shows the number of yards a football player runs in each quarter of a game. Find the mean number of yards the player runs per quarter.

Quarter	1	2	3	4
Yards	–2	14	–18	–6