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Reteaching 1-1

OBJECTIVE: Using variables as a shorthand way of expressing relationships	MATERIALS: None

You often hear word phrases such as *half as much* or *three times as deep*. These phrases describe mathematical relationships. You can translate word phrases like these into mathematical relationships called *expressions*.

Example

Translate the following word expressions into algebraic expressions.

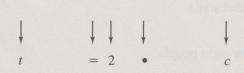| the sum of x and 15	seven times x
$x + 15$	$7x$
Remember that "sum" means to add.	Remember that "times" mean to multiply.

Example

Translate the following word sentence into an algebraic equation.

The weight of the truck is two times the weight of the car.

The weight of the truck is two times the weight of the car.   ← **Write an equal sign under the word *is*. Whatever is written to the left of *is* belongs on the left side of the =. Whatever is written to the right of *is* belongs on the right side of the =.**

$$t \quad = 2 \quad \bullet \quad c$$ ← **Represent the unknown amounts with variables.**

$$t = 2c$$ ← **The translation is complete. Check to make sure you have translated all parts of the equation.**

Exercises

Translate the following word expressions and sentences into algebraic expressions or equations.

1. a number increased by 5

2. 8 subtracted from a number

3. a number divided by 9

4. 3 less than five times a number

5. A number multiplied by 12 is 84.

6. 7 less than n is 22.

7. 8 times a number x is 72.

8. A number divided by 3 is 18.

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Practice 1-1

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Write an algebraic expression for each phrase.

1. 7 increased by x

2. p multiplied by 3

3. 10 decreased by m

4. n less than 7

5. the product of 2 and q

6. 3 more than m

Write a phrase for each algebraic expression.

7. $\frac{8}{a}$

8. $s - 10$

9. $x + 13$

10. $ab + 2$

Define a variable and write an algebraic expression for each phrase.

11. the difference of 8 and a number

12. the sum of 4 and a number

13. the product of 2 and a number

14. 3 increased by a number

15. 10 plus the quotient of a number and 15

16. 12 less than a number

Define a variable and write an algebraic equation to model each situation.

17. What is the total cost of buying several shirts at $24.95 each?

18. The number of gal of water used to water trees is 30 times the number of trees.

19. What is the amount of money in a bank containing only dimes?

20. What is the number of marbles left in a 48-marble bag after some marbles have been given away?

21. The total cost equals the price of the tickets multiplied by eight people.

22. What is the cost of buying several pairs of pants at $32.95 per pair?

Write an equation to model the relationship in each table.

23.

Number of Tickets	Total Cost
2	$7
4	$14
6	$21

24.

Number of Hours	Distance Traveled
1	55 mi
3	165 mi
5	275 mi

25.

Number of Hours	Total Pay
8	$40
12	$60
16	$80

26.

Total Cost	Change from $10
$10.00	$0
$9.00	$1.00
$7.50	$2.50

27.

Number of Days	Length
1	0.45 in.
4	1.80 in.
8	3.60 in.

28.

Miles Traveled	Miles Remaining
0	500
125	375
350	150

Reteaching 1-2

Exponents and Order of Operations

OBJECTIVE: Using the order of operations	**MATERIALS:** Three index cards or small pieces of paper

Review the order of operations to help you with this activity.

> ### Order of Operations
> 1. Perform any operations inside grouping symbols.
> 2. Simplify any term with exponents.
> 3. Multiply and divide in order from left to right.
> 4. Add and subtract in order from left to right.

Example

Write $+$ on the first index card, $-$ on the second card, and $\times$ on the third card. Shuffle the cards and place them face down on your desk. Randomly pick cards to fill in the blanks with operation signs. Once you have filled in the operation signs, simplify the expression.

6___(9___7)___8	$\longleftarrow$	**Pick cards to fill in the blanks with operation signs.**
$6 \times (9 - 7) + 8$	$\longleftarrow$	**Subtract 7 from 9 inside the grouping symbols.**
$6 \times \quad 2 \quad + 8$	$\longleftarrow$	**Do multiplication and division first. Multiply 6 by 2.**
$12 \quad + 8$	$\longleftarrow$	**Do addition and subtraction last. Add 12 and 8 to get the answer.**
20	$\longleftarrow$	**The answer is 20.**

Exercises

Randomly pick cards to fill in the operation symbols of the following expressions. Simplify the expressions.

1. 7____ 5____ 1

2. (3____ 9)____ 4

3. 8____ 2____ (5____ 10)

4. (3____ 7____ 6)____ 1

Simplify each expression by following the order of operations.

5. $(5 \cdot 3) - 18$

6. $5 \cdot (3 - 18)$

7. $2 \cdot (27 - 13 \cdot 2)$

8. $2 \cdot 27 - 13 \cdot 2$

9. $18 \div (9 - 15 \div 5)$

10. $18 \div 9 - 15 \div 5$

11. $2 \cdot 8 - 6^2$

12. $2 \cdot (8 - 6^2)$

Practice 1-2

Exponents and Order of Operations

Simplify each expression.

1. $4 + 6(8)$

2. $\dfrac{4(8 - 2)}{3 + 9}$

3. $4 \times 3^2 + 2$

4. $40 \div 5(2)$

5. $2.7 + 3.6 \times 4.5$

6. $3[4(8 - 2) + 5]$

7. $4 + 3(15 - 2^3)$

8. $17 - [(3 + 2) \times 2]$

9. $6 \times (3 + 2) \div 15$

Evaluate each expression.

10. $\dfrac{a + 2b}{5}$ for $a = 1$ and $b = 2$

11. $\dfrac{5m + n}{5}$ for $m = 6$ and $n = 15$

12. $x + 3y^2$ for $x = 3.4$ and $y = 3$

13. $7a - 4(b + 2)$ for $a = 5$ and $b = 2$

Simplify each expression.

14. $\dfrac{100 - 15}{9 + 8}$

15. $\dfrac{2(3 + 4)}{7}$

16. $\dfrac{3(4 + 12)}{2(7 - 3)}$

17. $14 + 3 \times 4$

18. $8 + 3(4 + 3)$

19. $3 + 4[13 - 2(6 - 3)]$

20. $8(5 + 30 \div 5)$

21. $(3.4)(2.7) + 5$

22. $50 \div 2 + 15 \times 4$

23. $7(9 - 5)$

24. $2(3^2) - 3(2)$

25. $4 + 8 \div 2 + 6 \times 3$

26. $(7 + 8) \div (4 - 1)$

27. $5[2(8 + 5) - 15]$

28. $(6 + 8) \times (8 - 4)$

29. $12\left(\dfrac{6 + 30}{9 - 3}\right)$

30. $14 + 6 \times 2^3 - 8 \div 2^2$

31. $\dfrac{7(14) - 3(6)}{2}$

32. $14 \div [3(8 - 2) - 11]$

33. $3\left(\dfrac{9 + 13}{6}\right)$

34. $\dfrac{4(8 - 3)}{3 + 2}$

35. $5 + 4^2 \times 8 - 2^3 \div 2^2$

36. $4^2 + 5^2(8 - 3)$

37. $5(3^2 + 2) - 2(6^2 - 5^2)$

Evaluate each expression for $a = 2$ and $b = 6$.

38. $2(7a - b)$

39. $(a^3 + b^2) \div a$

40. $3b \div (2a - 1) + b$

41. $\dfrac{5a + 2}{b}$

42. $\dfrac{3(b - 2)}{4(a + 1)}$

43. $9b + a^4 \div 8$

Use the expression $r + 0.12m$ to calculate the cost of renting a car. The basic rate is r. The number of miles driven is m.

44. The basic rate is $15.95. The car is driven 150 mi.

45. The basic rate is $32.50. The car is driven 257 mi.

Evaluate each expression for $s = 3$ and $t = 9$.

46. $8(4s - t)$

47. $(2t - 3s) \div 4$

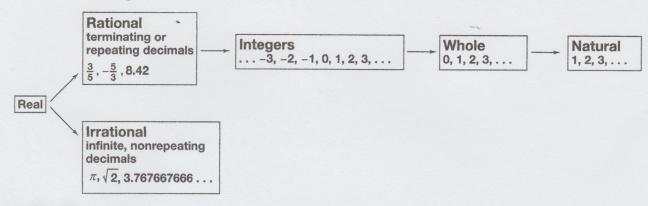**48.** $t^2 - s^4$

49. $s(3t + 6)$

50. $\dfrac{5s^2}{t}$

51. $\dfrac{2t^2}{s^3}$

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Reteaching 1-3

Exploring Real Numbers

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| **OBJECTIVE:** Classifying numbers | **MATERIALS:** None |

Review the following chart which shows the different classifications of real numbers.

Rational
terminating or repeating decimals
$\frac{3}{5}, -\frac{5}{3}, 8.42$
→ **Integers** $\ldots -3, -2, -1, 0, 1, 2, 3, \ldots$ → **Whole** $0, 1, 2, 3, \ldots$ → **Natural** $1, 2, 3, \ldots$

Real

Irrational
infinite, nonrepeating decimals
$\pi, \sqrt{2}, 3.767667666\ldots$

Example

Given the numbers $-4.4, \frac{14}{5}, 0, -9, 1\frac{1}{4}, -\pi$ and 32, tell which numbers belong to each set.

Natural:	32	numbers used to count
Whole:	$0, 32$	natural numbers and zero
Integers:	$0, -9, 32$	whole numbers and their opposites
Rational:	$-4.4, \frac{14}{5}, 0, -9, 1\frac{1}{4}, 32$	integers and terminating and repeating decimals
Irrational:	$-\pi$	infinite, nonrepeating decimals
Real:	$-4.4, \frac{14}{5}, 0, -9, 1\frac{1}{4}, -\pi, 32$	rational and irrational numbers

Exercises

Name the set(s) of numbers to which each number belongs.

1. $\frac{-5}{6}$ 2. 35.99 3. 0 4. $4\frac{1}{8}$

5. $\sqrt{5}$ 6. -80 7. $\frac{17}{5}$ 8. $\frac{12}{3}$

9. $\sqrt{100}$ 10. $-\sqrt{4}$ 11. 3.24 12. 3π

Give an example of each kind of number.

13. irrational number   14. whole number

15. negative integer   16. fractional rational number

17. rational decimal   18. natural number

Practice 1-3

Exploring Real Numbers

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Name the set(s) of numbers to which each number belongs.

1. -0.002

2. $12\frac{1}{2}$

3. 8

4. 5π

5. $\sqrt{7}$

6. -22

7. -3.4

8. $\sqrt{36}$

Decide whether each statement is *true* or *false*. If the statement is false, give a counterexample.

9. Every whole number is an integer.

10. Every integer is a whole number.

11. Every rational number is a real number.

12. Every multiple of 7 is odd.

Use <, =, or > to compare.

13. $-10.98 \ \blacksquare \ -10.99$

14. $-\frac{1}{3} \ \blacksquare \ -0.3$

15. $-\frac{11}{5} \ \blacksquare \ -\frac{4}{5}$

16. $-\frac{1}{2} \ \blacksquare \ -\frac{5}{10}$

17. $-\frac{3}{8} \ \blacksquare \ -\frac{7}{16}$

18. $\frac{3}{4} \ \blacksquare \ \frac{13}{16}$

Write in order from least to greatest.

19. $-\frac{8}{9}, -\frac{7}{8}, -\frac{22}{25}$

20. $-3\frac{4}{9}, -3.45, -3\frac{12}{25}$

21. $-\frac{1}{4}, -\frac{1}{5}, -\frac{1}{3}$

22. $-1.7, -1\frac{3}{4}, -1\frac{7}{9}$

23. $-\frac{3}{4}, -\frac{7}{8}, -\frac{2}{3}$

24. $2\frac{3}{4}, 2\frac{5}{8}, 2.7$

Determine which set of numbers is most reasonable for each situation.

25. the number of dolphins in the ocean

26. the height of a basketball player

27. the number of pets you have

28. the circumference of a compact disk

Find each absolute value.

29. $\left|\frac{3}{10}\right|$

30. $|-327|$

31. $|-3.46|$

32. $\left|-\frac{1}{2}\right|$

33. Name the sets(s) of numbers to which each number in the table belongs. Choose among: whole numbers, integers, rational numbers, irrational numbers, and real numbers.

Type of Account	Principal	Rate	Time (years)	Interest
Checking	$154.23	0.0375	$\frac{30}{365}$	$.48
Savings	$8000	0.055	$3\frac{1}{2}$	$1540

Reteaching 1-4

OBJECTIVE: Adding integers and decimals	**MATERIALS:** None

Review the following addition rules.

- To add two numbers with the same sign, *add* their absolute values. The sum has the same sign as the numbers.

- To add two numbers with different signs, find the *difference* of their absolute values. The sum has the same sign as the number with the greater absolute value.

Example

The following example shows you step by step how to add two numbers with different signs.

$$-6 + 2$$

$6 - 2$ ⟵   **Find the difference of their absolute values.**

4 ⟵   **Subtract.**

-4 ⟵   **Since -6 has the greater absolute value, the answer takes the negative sign.**

Exercises

Simplify. Be sure to check the sign of your answer.

1. $-3 + (-4)$ **2.** $12 + 5$ **3.** $-5 + 8$ **4.** $-8 + (-2)$

5. $-2 + (-3)$ **6.** $9 + (-12)$ **7.** $-3 + 5$ **8.** $-4 + 3$

9. $-2.3 + (-1.5)$ **10.** $4.5 + 3.1$ **11.** $-5.1 + 2.8$ **12.** $13.9 + 7.3$

13. $1.3 + (-1.1)$ **14.** $-3.6 + (-6.7)$ **15.** $1.4 + (-21.4)$ **16.** $-9.8 + 3.5$

Evaluate each expression for $a = 5$ and $b = -4$.

17. $-a + (-b)$ **18.** $-a + b$ **19.** $a + b$ **20.** $a + (-b)$

Evaluate each expression for $h = 3.4$.

21. $2.5 + h$ **22.** $-2.5 + h$ **23.** $2.5 + (-h)$ **24.** $-2.5 + (-h)$

25. $h + 7.1$ **26.** $-h + 7.1$ **27.** $h + (-7.1)$ **28.** $-h + (-7.1)$

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Practice 1-4 **Adding Real Numbers**

Simplify each expression.

1. $6 + (-4)$ **2.** $-2 + (-13)$ **3.** $-18 + 4$

4. $15 + (-32)$ **5.** $-27 + (-14)$ **6.** $8 + (-3)$

7. $-12.2 + 31.9$ **8.** $-2.3 + (-13.9)$ **9.** $19.8 + (-27.4)$

10. $\frac{1}{4} + \left(-\frac{3}{4}\right)$ **11.** $\frac{2}{3} + \left(-\frac{1}{3}\right)$ **12.** $-\frac{7}{12} + \frac{1}{6}$

13. $2\frac{2}{3} + (-1)$ **14.** $-3\frac{3}{4} + 1\frac{1}{2}$ **15.** $2\frac{1}{3} + \left(-4\frac{2}{3}\right)$

16. $-6.3 + 8.2$ **17.** $-3.82 + 2.83$ **18.** $-7.8 + 9$

19. $|-12| + |-21|$ **20.** $|-13 + 6|$ **21.** $-14 + |-7|$

Evaluate each expression for $m = 2.5$.

22. $-m + 1.6$ **23.** $-3.2 + m$ **24.** $-2.5 + (-m)$

Simplify.

25. $-3 + (-6) + 14$ **26.** $4 + (-8) + (-14)$ **27.** $2.7 + (-3.2) + 1.5$

28. $-2.5 + (-1.2) + (-2.3)$ **29.** $\frac{1}{2} + \left(-\frac{1}{3}\right) + \frac{1}{4}$ **30.** $-\frac{2}{3} + \left(-\frac{1}{3}\right) + \left(-1\frac{1}{3}\right)$

Simplify.

31. $\begin{bmatrix} 4 & -1 \\ 2 & 5 \end{bmatrix} + \begin{bmatrix} -1 & 2 \\ -2 & -3 \end{bmatrix}$ **32.** $\begin{bmatrix} -4.7 \\ 2.3 \\ -1.5 \end{bmatrix} + \begin{bmatrix} 5.1 \\ -2.7 \\ 2.6 \end{bmatrix}$

33. The temperature at 5:00 A.M. is $-38°$F. The temperature rises $20°$ by 11:00 A.M. What is the temperature at 11:00 A.M.?

34. A football team has possession of the ball on their own 15-yd line. The next two plays result in a loss of 7 yd and a gain of 3 yd, respectively. On what yard line is the ball after the two plays?

35. Suppose your opening checking account balance is $124.53. After you write a check for $57.49 and make a deposit of $103.49, what is your new balance?

36. During an emergency exercise, a submarine dives 37 ft, rises 16 ft, and then dives 18 ft. What is the net change in the submarine's position after the second dive?

Reteaching 1-5

Subtracting Real Numbers

. . . .

OBJECTIVE: Subtracting integers and decimals   **MATERIALS:** None

Review the following subtraction rules.

- To subtract a number, rewrite the problem to add the opposite of the number.

- Follow the rules for addition of numbers.

Example

The following example shows you step by step how to subtract two numbers.

$$5 - 11$$

$5 + (-11)$ ⟵ **Rewrite the problem to add the opposite of the number.**

$11 - 5$ ⟵ **Find the difference of their absolute values.**

6 ⟵ **Subtract.**

-6 ⟵ **Since -11 has the greater absolute value, the answer takes the negative sign.**

Exercises

Simplify. Be sure to check the sign of your answer.

1. $7 - 12$ **2.** $6 - 9$ **3.** $4 - (-5)$ **4.** $7 - (-3)$

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

9. $-3.1 - (-5.4)$ **10.** $8.3 - 5.1$ **11.** $-7.8 - 6.6$ **12.** $-4.8 - 2.5$

13. $8.7 - 2.5$ **14.** $-4.6 - (-3)$ **15.** $-9.3 - (-8.1)$ **16.** $-9.9 - 3.8$

Evaluate each expression for $a = -4$ and $b = 3$.

17. $a - b$ **18.** $-a - b$ **19.** $a - (-b)$ **20.** $-a - (-b)$

21. $3b - a$ **22.** $-|b|$ **23.** $|a - b|$ **24.** $|a| - 3|b|$

Subtract. (Hint: Subtract corresponding elements.)

25. $\begin{bmatrix} -3 & -2 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$ **26.** $\begin{bmatrix} \frac{1}{2} \\ -1 \end{bmatrix} - \begin{bmatrix} \frac{2}{3} \\ -3 \end{bmatrix}$

Practice 1-5

Simplify.

1. $13 - 6$ **2.** $19 - 35$ **3.** $-4 - 8$

4. $-14 - (-6)$ **5.** $18 - (-25)$ **6.** $-32 - 17$

7. $-6.8 - 14.6$ **8.** $-9.3 - (-23.9)$ **9.** $-8.2 - 0.8$

10. $18.3 - (-8.1)$ **11.** $-3 - (-15)$ **12.** $6.4 - 17$

13. $\frac{3}{4} - 1\frac{1}{4}$ **14.** $-\frac{1}{3} - \frac{2}{3}$ **15.** $-\frac{1}{4} - \left(-\frac{3}{4}\right)$

16. $|-11| - |-29|$ **17.** $|-4 - 8|$ **18.** $|9.8| - |-15.7|$

19. $|-8 - (-32)|$ **20.** $|3.7 - (-6.8)|$ **21.** $2.83 - 3.82$

Evaluate each expression for $c = -3$ and $d = -6$.

22. $c - d$ **23.** $-c - d$ **24.** $-c - (-d)$

25. $|c + d|$ **26.** $-c + d$ **27.** $3c - 2d$

Simplify.

28. $8 - (-4) - (-5)$ **29.** $6 - 10 - 4$ **30.** $10 - 14 - 15$

31. $-6 - 3 - (-2)$ **32.** $-5 + 7 - 9$ **33.** $-2 - 2 - 4$

Subtract.

34. $\begin{bmatrix} -3 & -1 \\ 2 & 4 \end{bmatrix} - \begin{bmatrix} 5 & -2 \\ -3 & 8 \end{bmatrix}$ **35.** $\begin{bmatrix} 6.1 & -4 \\ -3.7 & -2.1 \end{bmatrix} - \begin{bmatrix} 7.0 & -2.3 \\ -1.6 & 4.2 \end{bmatrix}$

36. The temperature in the evening was 68°F. The following morning, the temperature was 39°F. What is the difference between the two temperatures?

37. What is the difference in altitude between Mt. Everest, which is about 29,028 ft above sea level, and Death Valley, which is about 282 ft below sea level?

38. Suppose the balance in your checking account was $234.15 when you wrote a check for $439.87. (This is known as overdrawing your account.) Describe the account's new balance.

39. After three plays in which a football team lost 7 yd, gained 3 yd, and lost 1 yd, respectively, the ball was placed on the team's own 30-yd line. Where was the ball before the three plays?

Practice 1-6

Multiplying and Dividing Real Numbers

Simplify each expression.

1. $(-2)(8)$

2. $(-6)(-9)$

3. $(-3)^4$

4. -2^5

5. $(6)(-8)$

6. $(-14)^2$

7. $2(-4)(-6)$

8. $-30 \div (-5)$

9. $\frac{-52}{-13}$

10. $(-8)(5)(-3)$

11. -7^2

12. -3^5

13. $\frac{-68}{17}$

14. $\frac{(-4)(-13)}{-26}$

15. $\frac{225}{(-3)(-5)}$

Evaluate each expression.

16. x^3 for $x = -5$

17. $s^2t \div 10$ for $s = -2$ and $t = 10$

18. $-2m + 4n^2$ for $m = -6$ and $n = -5$

19. $\frac{v}{w}$ for $v = \frac{2}{5}$ and $w = -\frac{1}{2}$

20. $-cd^2$ for $c = 2$ and $d = -4$

21. $(x + 4)^2$ for $x = -11$

22. $\left(\frac{a}{b}\right)^2 + b^3$ for $a = 24$ and $b = -6$

23. $4p^2 + 7q^3$ for $p = -3$ and $q = -2$

24. $(e + f)^4$ for $e = -3$ and $f = 7$

25. $5f^2 - z^2$ for $f = -1$ and $z = -4$

Simplify each expression.

26. $2^4 - 3^2 + 5^2$

27. $(-8)^2 - 4^3$

28. $32 \div (-7 + 5)^3$

29. $\frac{3}{4} \div \left(-\frac{3}{7}\right)$

30. $18 + 4^2 \div (-8)$

31. $26 \div [4 - (-9)]$

32. $4^3 - (2 - 5)^3$

33. $-(-4)^3$

34. $(-8)(-5)(-3)$

35. $(-3)^2 - 4^2$

36. $\frac{-45}{-15}$

37. $(-2)^6$

38. $\frac{-90}{6}$

39. $\frac{-15}{(7 - 4)}$

40. $\frac{195}{-13}$

Evaluate each expression.

41. $(a + b)^2$ for $a = 6$ and $b = -8$

42. $d^3 \div e$ for $d = -6$ and $e = -3$

43. $(m + 5n)^3$ for $m = 2$ and $n = -1$

44. $j^5 - 5k$ for $j = -4$ and $k = -1$

45. $xy + z$ for $x = -4, y = 3$, and $z = -3$

46. $4s \div (-3t)$ for $s = -6$ and $t = -2$

47. $\frac{r^3}{s}$ for $r = -6$ and $s = -2$

48. $\frac{-h^5}{-4}$ for $h = 4$

Reteaching 1-7

OBJECTIVE: Using the Distributive Property   **MATERIALS:** None

You can compare the Distributive Property to distributing paper to the class. Just as you distribute a piece of paper to each person in the class, you distribute the number immediately outside the parentheses to each term inside the parentheses by multiplying.

Example

Simplify $3(2x + 3)$ by using the Distributive Property.

$3(2x + 3)$ ⟵   **Draw arrows to show that 3 is distributed to the $2x$ and to the 3.**

$3(2x) + 3(3)$ ⟵   **Use the Distributive Property.**

$6x + 9$ ⟵   **Simplify.**

Example

Simplify $-(4x + 7)$ by using the Distributive Property.

$-1(4x + 7)$ ⟵   **Rewrite using the Multiplication Property of −1.**

$-1(4x + 7)$ ⟵   **Draw arrows to show that −1 is distributed to the $4x$ and to the 7.**

$-1(4x) + (-1)(7)$ ⟵   **Use the Distributive Property.**

$-4x - 7$ ⟵   **Simplify.**

Exercises

Draw arrows to show the Distributive Property. Then simplify each expression.

1. $2(5x + 4)$ **2.** $\frac{1}{4}(12x - 8)$ **3.** $4(7x - 3)$

4. $5(4 + 2x)$ **5.** $6(5 - 3x)$ **6.** $0.1(30x - 50)$

7. $(2x - 4)3$ **8.** $(3x + 4)7$ **9.** $8(x + y)$

10. $-(4x + 3)$ **11.** $-(-2x + 1)$ **12.** $-(-6x - 3)$

13. $-(14x - 3)$ **14.** $-(-7x - 1)$ **15.** $-(3x + 4)$

Practice 1-7

The Distributive Property

Simplify each expression.

1. $2(x + 6)$

2. $-5(8 - b)$

3. $4(-x + 7)$

4. $(5c - 7)(-3)$

5. $-2.5(3a + 5)$

6. $-(3k - 12)$

7. $-\frac{3}{4}(12 - 16d)$

8. $\frac{2}{3}(6h - 1)$

9. $(-3.2x + 2.1)(-6)$

10. $3.5(3x - 8)$

11. $4(x + 7)$

12. $-2.5(2a - 4)$

13. $\frac{2}{3}(12 - 15d)$

14. $-2(k - 11)$

15. $-\frac{1}{3}(6h + 15)$

16. $(2c - 8)(-4)$

17. $-(4 - 2b)$

18. $2(3x - 9)$

19. $4(2r + 8)$

20. $-5(b - 5)$

21. $3(f + 2)$

22. $6h + 5(h - 5)$

23. $-5d + 3(2d - 7)$

24. $7 + 2(4x - 3)$

25. $2(3h + 2) - 4h$

26. $2(4 + y)$

27. $\frac{1}{2}(2n - 4) - 2n$

28. $-w + 4(w + 3)$

29. $0.4(3d - 5)$

30. $-4d + 2(3 + d)$

31. $2x + \frac{3}{4}(4x + 16)$

32. $2(3a + 2)$

33. $5(t - 3) - 2t$

34. $5(b + 4) - 6b$

35. $\frac{2}{5}(5k + 35) - 8$

36. $0.4(2s + 4)$

37. $\frac{2}{3}(9b - 27)$

38. $\frac{1}{2}(12n - 8)$

39. $0.5(2x - 4)$

40. $2(a - 4) + 15$

41. $13 + 2(5c - 2)$

42. $7 + 2(\frac{1}{5}a - 3)$

43. $5(3x + 12)$

44. $2(m + 1)$

45. $4(2a + 2) - 17$

46. $-4x + 3(2x - 5)$

47. $3(t - 12)$

48. $-6 - 3(2k + 4)$

Write an expression for each phrase.

49. 5 times the quantity x plus 6

50. twice the quantity y minus 8

51. the product of -15 and the quantity x minus 5

52. 32 divided by the quantity y plus 12

53. -8 times the quantity 4 decreased by w

54. the quantity x plus 9 times the quantity 7 minus x

Name _____ Class _____ Date _____

Reteaching 1-8

Properties of Real Numbers

• •

OBJECTIVE: Recognizing properties   **MATERIALS:** None

The properties of real numbers allow you to write equivalent expressions.

The Commutative Properties of Addition and Multiplication allow you to add or to multiply two numbers in any order.

$a + b = b + a$ $a \cdot b = b \cdot a$

$3 + 6 = 6 + 3$ $12 \cdot 4 = 4 \cdot 12$

The Associative Properties of Addition and Multiplication allow you to regroup numbers.

$(a + b) + c = a + (b + c)$ $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

$(1 + 3) + 6 = 1 + (3 + 6)$ $(1 \cdot 3) \cdot 6 = 1 \cdot (3 \cdot 6)$

The Distributive Property distributes multiplication over addition and subtraction.

$a(b + c) = ab + ac$ $a(b - c) = ab - ac$

$3(4 + 6) = (3 \cdot 4) + (3 \cdot 6)$ $5(9 - 3) = (5 \cdot 9) - (5 \cdot 3)$

Example

Name the property that each equation illustrates.

$72 + 56 = 56 + 72$ ⟵ **Commutative Property of Addition: The order of the addends is changed.**

$4(5 - 9) = (4 \cdot 5) - (4 \cdot 9)$ ⟵ **Distributive Property: The 4 is distributed.**

$30 \cdot (14 \cdot 5) = (30 \cdot 14) \cdot 5$ ⟵ **Associative Property of Multiplication: The numbers are regrouped.**

Exercises

Name the property that each equation illustrates.

1. $(17 + 4) + 9 = 17 + (4 + 9)$ **2.** $7(3 + 4) = (7 \cdot 3) + (7 \cdot 4)$

3. $84 \cdot 26 = 26 \cdot 84$ **4.** $(3 \cdot 6) \cdot 7 = 3 \cdot (6 \cdot 7)$

5. $8(6 - 3) = (8 \cdot 6) - (8 \cdot 3)$ **6.** $4.2 + 3.4 = 3.4 + 4.2$

Write the number that makes each statement true.

7. $27 + \underline{\quad} = 12 + 27$ **8.** $(8 + 20) + 9 = \underline{\quad} + (20 + 9)$

9. $9(8 - 5) = (\underline{\quad} \cdot 8) - (\underline{\quad} \cdot 5)$ **10.** $8 \cdot 10 = 10 \cdot \underline{\quad}$

11. $3 \cdot (9 \cdot 6) = (3 \cdot 9) \cdot \underline{\quad}$ **12.** $7(6 + 4) = (\underline{\quad} \cdot 6) + (\underline{\quad} \cdot 4)$

Practice 1-8

Properties of Real Numbers

Name the property that each equation illustrates.

1. $83 + 6 = 6 + 83$

2. $8 + x = x + 8$

3. $1 \cdot 4y = 4y$

4. $15x + 15y = 15(x + y)$

5. $(8 \cdot 7) \cdot 6 = 8 \cdot (7 \cdot 6)$

6. $\frac{2}{3}\left(\frac{3}{2}\right) = 1$

7. $3(a + 2b) = 3a + 6b$

8. $7x + 2y = 2y + 7x$

9. $7 + (8 + 15) = (7 + 8) + 15$

10. $x + (-x) = 0$

11. $x + y = y + x$

12. $6 \cdot (x \cdot y) = (6 \cdot x) \cdot y$

13. $16 + 0 = 16$

14. $3w + 5y = 5y + 3w$

15. $7(3 + 4y) = 21 + 28y$

16. $0 = 30 \cdot 0$

17. $4a + (5b + 6c) = (4a + 5b) + 6c$

18. $ab + c = ba + c$

19. $wr = rw$

20. $20(a + b) = 20(b + a)$

Give a reason to justify each step.

21.
 a. $4c + 3(2 + c) = 4c + 6 + 3c$
 b. $\qquad\qquad\;\; = 4c + 3c + 6$
 c. $\qquad\qquad\;\; = (4c + 3c) + 6$
 d. $\qquad\qquad\;\; = (4 + 3)c + 6$
 e. $\qquad\qquad\;\; = 7c + 6$

22.
 a. $8w - 4(7 - w) = 8w - 28 + 4w$
 b. $\qquad\qquad\quad\;\; = 8w + (-28) + 4w$
 c. $\qquad\qquad\quad\;\; = 8w + 4w + (-28)$
 d. $\qquad\qquad\quad\;\; = (8 + 4)w + (-28)$
 e. $\qquad\qquad\quad\;\; = 12w + (-28)$
 f. $\qquad\qquad\quad\;\; = 12w - 28$

23.
 a. $5(x + y) + 2(x + y) = 5x + 5y + 2x + 2y$
 b. $\qquad\qquad\qquad\quad\; = 5x + 2x + 5y + 2y$
 c. $\qquad\qquad\qquad\quad\; = (5 + 2)x + (5 + 2)y$
 d. $\qquad\qquad\qquad\quad\; = 7x + 7y$

Use mental math to simplify each expression.

24. $48 + 27 + 2 + 3$

25. $10 \cdot 72 \cdot 5 \cdot 2$

26. $10 \cdot 8 \cdot 3 \cdot 10$

27. $8\frac{1}{2} + 4\frac{1}{3} + 2\frac{1}{2} + 2\frac{2}{3}$

28. Henry bought an apple for $0.75, some apricots for $1.50, some cherries for $3.25, and three bananas for $1.50. Find the total cost of the fruit.

29. Suppose you buy some camping supplies. You purchase waterproof matches for $3.95, a compass for $18.25, flashlight batteries for $3.75, and a map for $2.05. Find the total cost of the supplies.

30. You go to the video store and rent some DVDs for $8.50 and a video game for $3.69. While there, you buy a box of popcorn for $2.31 and a candy bar for $1.50. Find the total cost of the items.

Reteaching 1-9

Graphing Data on the Coordinate Plane

OBJECTIVE: Identifying coordinates on the coordinate plane

MATERIALS: Graph paper

Coordinates give the location of a point. To locate a point (x, y) on a graph, start at the origin, $(0, 0)$. Move x units to the right or to the left along the x-axis and y units up or down along the y-axis.
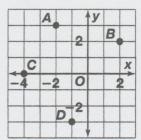
Example

Give the coordinates of points $A, B, C,$ and D.

Point A is 2 units to the left of the origin and 3 units up. The coordinates of A are $(-2, 3)$.

Point B is 2 units to the right of the origin and 2 units up. The coordinates of B are $(2, 2)$.

Point C is 4 units to the left of the origin and 0 units up. The coordinates of C are $(-4, 0)$.

Point D is 1 unit to the left of the origin and 3 units down. The coordinates of D are $(-1, -3)$.

Exercises

Name the coordinates of each point.

1. G 2. H

3. J 4. K

5. L 6. M

7. N 8. P

9. Q 10. R

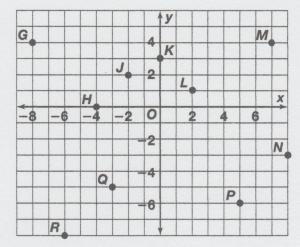**Graph the points on the same coordinate plane.**

11. $S\ (3, -5)$ 12. $T\ (0, 0)$

13. $U\ (-1, -2)$ 14. $V\ (4, 5)$

15. $W\ (0, 3)$ 16. $Z\ (-5, 0)$

Practice 1-9

Name the coordinates of each point on the graph at the right.

1. A

2. B

3. C

4. D

In which quadrant would you find each point?

5. $(-3, 4)$

6. $(-6, -6)$

7. $(1, 5)$

8. $(8, -9)$

Use the data in each table to draw a scatter plot.

9. Height and Hourly Pay of Ten People

Height (inches)	Hourly Pay	Height (inches)	Hourly Pay
62	$6.00	72	$8.00
65	$8.50	72	$6.00
68	$6.50	73	$7.50
70	$6.00	74	$6.25
70	$7.50	74	$8.00

10. Speed of Winds in Some U.S. Cities

Station	Average Speed (mi/h)	Highest Speed (mi/h)
Atlanta, GA	9.1	60
Casper, WY	12.9	81
Dallas, TX	10.7	73
Mobile, AL	9.0	63
St. Louis, MO	9.7	60

Source: National Climatic Data Center

11. In Exercise 9, is there a *positive correlation*, a *negative correlation*, or *no correlation* between height and hourly pay?

12. In Exercise 10, is there a *positive correlation*, a *negative correlation*, or *no correlation* between average wind speed and highest wind speed?

Would you expect a *positive correlation*, a *negative correlation*, or *no correlation* between the two data sets? Why?

13. a person's age and the number of pets he or she has

14. the number of times you brush your teeth and the number of cavities you get

15. the number of days it rains per year and the number of umbrellas sold

Is there a *positive correlation*, a *negative correlation*, or *no correlation* between the two data sets in each scatter plot?

16.

17.

18.