

1-2 Properties of Real Numbers**What You'll Learn**

Skim the Examples for Lesson 1-2. Predict two things you think you will learn about the properties of real numbers.

- _____
- _____

Active Vocabulary

New Vocabulary Match the term with its definition by drawing a line to connect the two.

<i>integers</i>	numbers that can be expressed as a ratio of two integers; the decimal form either terminates or repeats
<i>real numbers</i>	numbers used for counting {1, 2, 3, . . . }
<i>natural numbers</i>	the set of numbers which represent all points on a number line
<i>rational numbers</i>	numbers that cannot be expressed as a ratio of two integers; the decimal form neither terminates, nor repeats
<i>whole numbers</i>	the counting numbers plus zero {0, 1, 2, 3, . . . }
<i>irrational numbers</i>	the whole numbers and their opposites

Vocabulary Link Explain each of the mathematical representations of properties in your own words.

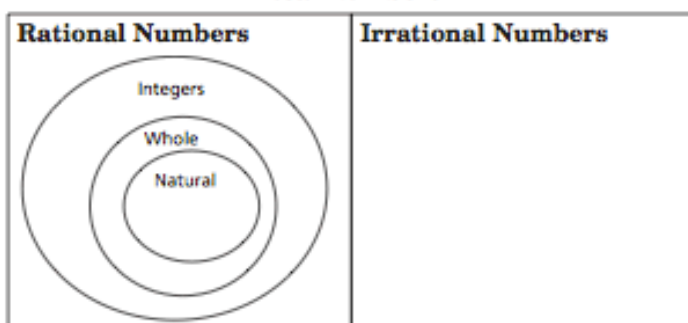
- $a + b = b + a$ _____
- $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ _____
- $a + (-a) = 0$ _____

Lesson 1-2 (continued)**Main Idea****Details****Real Numbers**

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Write each of the following numbers into the appropriate location in the Venn diagram.

$$\{\sqrt{2}, 4, 0, \frac{2}{3}, 1000, \pi, 2.25, -22, 2.\overline{6541}\}$$

Real Numbers**Properties of Real Numbers**

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State the property represented in each equation.

1. $6.72 + (-6.72) = 0$ _____

2. $3b + 2b = (3 + 2)b$ _____

3. $-3(2 \cdot 5) = (-3 \cdot 2)5$ _____

4. $5 \cdot a = a \cdot 5$ _____

5. $\frac{6}{11} \cdot \frac{11}{6} = 1$ _____

Helping You Remember

How can the words *commuter*, *association*, and *distribution* help you remember the difference between the commutative, associative and distributive properties?

1-2 Skills Practice**Properties of Real Numbers**

Name the sets of numbers to which each number belongs.

1. 34

2. -525

3. 0.875

4. $\frac{12}{3}$

5. $-\sqrt{9}$

6. $\sqrt{30}$

Name the property illustrated by each equation.

7. $3 \cdot x = x \cdot 3$

8. $3a + 0 = 3a$

9. $2(r + w) = 2r + 2w$

10. $2r + (3r + 4r) = (2r + 3r) + 4r$

11. $5y\left(\frac{1}{5y}\right) = 1$

12. $15x(1) = 15x$

13. $0.6[25(0.5)] = [0.6(25)]0.5$

14. $(10b + 12b) + 7b = (12b + 10b) + 7b$

Find the additive inverse and multiplicative inverse for each number.

15. 15

16. 1.25

17. $-\frac{4}{5}$

18. $3\frac{3}{4}$

Simplify each expression.

19. $3x + 5y + 2x - 3y$

20. $x - y - z + y - x + z$

21. $-(3g + 3h) + 5g - 10h$

22. $a^2 - a + 4a - 3a^2 + 1$

23. $3(m - z) + 5(2m - z)$

24. $2x - 3y - (5x - 3y - 2z)$

25. $6(2w + v) - 4(2v + 1w)$

26. $\frac{1}{3}(15d + 3c) - \frac{1}{2}(8c - 10d)$

1-2 Practice**Properties of Real Numbers**

Name the sets of numbers to which each number belongs.

1. 6425

2. $\sqrt{7}$

3. 2π

4. 0

5. $\sqrt{\frac{25}{36}}$

6. $-\sqrt{16}$

7. -35

8. -31.8

Name the property illustrated by each equation.

9. $5x \cdot (4y + 3x) = 5x \cdot (3x + 4y)$

10. $7x + (9x + 8) = (7x + 9x) + 8$

11. $5(3x + y) = 5(3x + 1y)$

12. $7n + 2n = (7 + 2)n$

13. $3(2x)y = (3 \cdot 2)(xy)$

14. $3x \cdot 2y = 3 \cdot 2 \cdot x \cdot y$

15. $(6 + -6)y = 0y$

16. $\frac{1}{4} \cdot 4y = 1y$

17. $5(x + y) = 5x + 5y$

18. $4n + 0 = 4n$

Find the additive inverse and multiplicative inverse for each number.

19. 0.4

20. -1.6

21. $-\frac{11}{16}$

22. $5\frac{5}{6}$

Simplify each expression.

23. $5x - 3y - 2x + 3y$

24. $-11a - 13b + 7a - 3b$

25. $8x - 7y - (3 - 6y)$

26. $4c - 2c - (4c + 2c)$

27. $3(r - 10s) - 4(7s + 2r)$

28. $\frac{1}{5}(10a - 15b) + \frac{1}{2}(8b + 4a)$

29. $2(4z - 2x + y) - 4(5z + x - y)$

30. $\frac{5}{6}\left(\frac{3}{5}x + 12y\right) - \frac{1}{4}(2x - 12y)$

31. **TRAVEL** Olivia drives her car at 60 miles per hour for t hours. Ian drives his car at 50 miles per hour for $(t + 2)$ hours. Write a simplified expression for the sum of the distances traveled by the two cars.

32. **NUMBER THEORY** Use the properties of real numbers to tell whether the following statement is true or false: If a and $b \neq 0$ and $a > b$, it follows that $a\left(\frac{1}{a}\right) > b\left(\frac{1}{b}\right)$. Explain your reasoning.