

Properties

Name _____

Period _____

Determine whether the two expressions are equivalent. If so, tell what property is applied. If not, explain why.

1. $(8+27)+52$ and $8+(27+52)$ _____

2. $17-3+6$ and $3-17+6$ _____

3. $-32+32$ and 0 _____

4. ab and ba _____

5. Nadia bought suntan lotion for \$12, sunglasses for \$15, and a towel for \$18. Use the Associative Property to write two equivalent expressions to represent the total cost. Then find the total cost of her purchases.

6. Anita's mother hosted a party. The table shows the costs. Use the Commutative Property to write two equivalent expressions that could be used to find the total amount spent.

Find the value of x that makes a true statement

7. $24 + x = 0$

8. $17 \bullet x = 3 \bullet 17$

9. $7 + x = 7$

10. $x \bullet \frac{1}{5} = 1$

11. A cash drawer contains ten-, five-, and one-dollar bills. An expression for the value in dollars of T tens, V fives, and N ones is $10T + 5V + 1N$. Find the value in dollars of the bills in the drawer for $T = 2$, $V = 0$, and $N = 4$.

12. **Error Analysis** A class must use the Associative Property of Addition to write an expression equivalent to $38 + (18 + 14)$. One student incorrectly comes up with the expression $38 + (14 + 18)$.
- a) Use the Associative Property of Addition to write an expression equivalent to $38 + (18 + 14)$.

b) What was the student's error?

13. Juan is planning to paint a room. He spends \$33 on brushes, \$80 on paint, and \$20 on a drop cloth.
- a) Use the Associative Property of Addition to write two equivalent expressions that show the total cost.

b) How can using the Associative Property of Addition make it easier to find the total cost?

- A. Grouping 33 and 20 makes finding the total easier because they are the least numbers in the expression.
- B. Grouping 80 and 20 makes finding the total easier because their sum is 100.
- C. Grouping 33 and 80 makes finding the total easier because they are the greatest numbers in the expression.

c) Find the total cost.

Determine whether the two expressions are equivalent. If so, tell what property is applied. If not, explain why.

1. $(8+27)+52$ and $8+(27+52)$ Yes Associative Property of Addition

2. $17-3+6$ and $3-17+6$ No Cannot have subtraction and use Commutative Property

3. $-32+32$ and 0 Yes Inverse Property of Addition

4. ab and ba Yes Commutative Property of Multiplication

5. Nadia bought suntan lotion for \$12, sunglasses for \$15, and a towel for \$18. Use the Associative Property to write two equivalent expressions to represent the total cost. Then find the total cost of her purchases.

$$(12 + 15) + 18 = 12 + (15 + 18)$$

$$\underbrace{12 + 15}_{27} + 18$$

$$\underbrace{27 + 18}_{45}$$

6. Anita's mother hosted a party. The table shows the costs. Use the Commutative Property to write two equivalent expressions that could be used to find the total amount spent.

$$12 + 24 + 6 = 6 + 24 + 12 \quad 12, 24, 6$$

Find the value of x that makes a true statement

7. $24 + x = 0$

$$x = -24$$

8. $17 \cdot x = 3 \cdot 17$

$$x = 3$$

9. $7 + x = 7$

$$x = 0$$

10. $x \cdot \frac{1}{5} = 1$

$$x = 5$$

11. A cash drawer contains ten-, five-, and one-dollar bills. An expression for the value in dollars of T tens, V fives, and N ones is $10T + 5V + 1N$. Find the value in dollars of the bills in the drawer for $T = 2$, $V = 0$, and $N = 4$.

$$\begin{array}{r} 10 \cdot 2 + 5 \cdot 0 + 1 \cdot 4 \\ \hline 20 + 0 + 4 \\ \hline \$24 \end{array}$$

12. Error Analysis A class must use the Associative Property of Addition to write an expression equivalent to $38 + (18 + 14)$. One student incorrectly comes up with the expression $38 + (14 + 18)$.
- a) Use the Associative Property of Addition to write an expression equivalent to $38 + (18 + 14)$.

$$\underline{(38 + 18) + 14}$$

- b) What was the student's error?

The student used Commutative Property in the () instead of switching the grouping.

13. Juan is planning to paint a room. He spends \$33 on brushes, \$80 on paint, and \$20 on a drop cloth.
- a) Use the Associative Property of Addition to write two equivalent expressions that show the total cost.

$$(33 + 80) + 20 = 33 + (80 + 20)$$

- b) How can using the Associative Property of Addition make it easier to find the total cost?
- A. Grouping 33 and 20 makes finding the total easier because they are the least numbers in the expression.
- B. Grouping 80 and 20 makes finding the total easier because their sum is 100.
- C. Grouping 33 and 80 makes finding the total easier because they are the greatest numbers in the expression.
- c) Find the total cost.

$$\begin{array}{r} 33 + (80 + 20) \\ 33 + 100 \\ \hline \$133 \end{array}$$