

Study Guide and Intervention

Algebra: Properties

Property	Arithmetic	Algebra
Distributive Property	$5(3 + 4) = 5(3) + 5(4)$	$a(b + c) = a(b) + a(c)$
Commutative Property of Addition	$5 + 3 = 3 + 5$	$a + b = b + a$
Commutative Property of Multiplication	$5 \times 3 = 3 \times 5$	$a \times b = b \times a$
Associative Property of Addition	$(2 + 3) + 4 = 2 + (3 + 4)$	$(a + b) + c = a + (b + c)$
Associative Property of Multiplication	$(4 \times 5) \times 6 = 4 \times (5 \times 6)$	$(a \times b) \times c = a \times (b \times c)$
Identity Property of Addition	$5 + 0 = 5$	$a + 0 = a$
Identity Property of Multiplication	$5 \times 1 = 5$	$a \times 1 = a$

EXAMPLE 1 Use the Distributive Property to write $6(4 + 3)$ as an equivalent expression. Then evaluate the expression.

$$\begin{aligned}
 6(4 + 3) &= 6 \cdot 4 + 6 \cdot 3 && \text{Apply the Distributive Property.} \\
 &= 24 + 18 && \text{Multiply.} \\
 &= 42 && \text{Add.}
 \end{aligned}$$

EXAMPLE 2 Name the property shown by each statement.

$$\begin{aligned}
 5 \times 4 &= 4 \times 5 && \text{Commutative Property of Multiplication} \\
 12 + 0 &= 12 && \text{Identity Property of Addition} \\
 7 + (6 + 3) &= (7 + 6) + 3 && \text{Associative Property of Addition}
 \end{aligned}$$

EXERCISES

Use the Distributive Property to write each expression as an equivalent expression. Then evaluate the expression.

1. $5(7 + 2)$ 2. $4(9 + 1)$ 3. $2(6 + 7)$

Name the property shown by each statement.

4. $9 \times 1 = 9$ 5. $7 \times 3 = 3 \times 7$
6. $(7 + 8) + 2 = 7 + (8 + 2)$ 7. $6(3 + 2) = 6(3) + 6(2)$
8. $15 + 12 = 12 + 15$ 9. $1 \times 20 = 20$
10. $(9 \times 5) \times 2 = 9 \times (5 \times 2)$ 11. $3 = 0 + 3$

Practice: Skills**Algebra: Properties**

Use the Distributive Property to write each expression as an equivalent expression. Then evaluate the expression.

1. $3(5 + 1)$

2. $(2 + 7)5$

3. $(10 + 2)7$

4. $2(9 - 8)$

5. $4(10 - 2)$

6. $6(13 + 4)$

Name the property shown by each statement.

7. $2 \times (3 \times 7) = (2 \times 3) \times 7$

8. $6 + 3 = 3 + 6$

9. $3(9 - 7) = 3(9) - 3(7)$

10. $18 \times 1 = 18$

11. $7 \times 2 = 2 \times 7$

12. $6 + (1 + 4) = (6 + 1) + 4$

13. $7 + 0 = 7$

14. $0 + 12 = 12$

15. $625 + 281 = 281 + 625$

16. $(12 \times 18) \times 5 = 12 \times (18 \times 5)$

17. $2(8 + 2) = 2(8) + 2(2)$

18. $(15 + 11) + 9 = 15 + (11 + 9)$

19. $(6 + r) + s = 6 + (r + s)$

20. $(4 \times 8) \times a = 4 \times (8 \times a)$

21. $p \times 1 = p$

22. $a + 5 = 5 + a$

23. $y \times 3 = 3 \times y$

24. $b + 0 = b$

25. $(x + y) + z = x + (y + z)$

26. $6(200 + 50) = 6(200) + 6(50)$