NAME Notes DATE _____ PERIOD _____

1-4 Study Guide and Intervention

The Distributive Property

Evaluate Expressions The Distributive Property can be used to help evaluate expressions.

Distributive Property	For any numbers a, b, and c, $a(b + c) = ab + ac$ and $(b + c)a = ba + ca$ and $a(b - c) = ab - ac$ and $(b - c)a = ba - ca$.

Example 1 **Use the Distributive Property to rewrite $6(8 + 10)$. Then evaluate.**

$6(8 + 10) = 6 \cdot 8 + 6 \cdot 10$ Distributive Property
$= 48 + 60$ Multiply.
$= 108$ Add.

Example 2 **Use the Distributive Property to rewrite $-2(3x^2 + 5x + 1)$. Then simplify.**

$-2(3x^2 + 5x + 1) = -2(3x^2) + (-2)(5x) + (-2)(1)$ Distributive Property
$= -6x^2 + (-10x) + (-2)$ Multiply.
$= -6x^2 - 10x - 2$ Simplify.

Exercises

Use the Distributive Property to rewrite each expression. Then evaluate.

1. $20(31)$ $20(30+1) = 620$
2. $12 \cdot 4\frac{1}{2}$ $12\left(4+\frac{1}{2}\right) = 54$
3. $5(311)$ $5(300+11) = 1555$
4. $5(4x - 9)$ $20x - 45$
5. $3(8 - 2x)$ $24 - 6x$
6. $12\left(6 - \frac{1}{2}x\right)$ $72 - 6x$
7. $12\left(2 + \frac{1}{2}x\right)$ $24 + 6x$
8. $\frac{1}{4}(12 - 4t)$ $3 - t$
9. $3(2x - y)$ $6x - 3y$
10. $2(3x + 2y - z)$ $6x + 4y - 2z$
11. $(x - 2)y$ $xy - 2y$
12. $2(3a - 2b + c)$ $6a - 4b + 2c$
13. $\frac{1}{4}(16x - 12y + 4z)$ $4x - 3y + 1z$
14. $(2 - 3x + x^2)3$ $6 - 9x + 3x^2$
15. $-2(2x^2 + 3x + 1)$ $-4x^2 - 6x - 2$

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1-4 Study Guide and Intervention *(continued)*

The Distributive Property

Simplify Expressions A **term** is a number, a variable, or a product or quotient of numbers and variables. **Like terms** are terms that contain the same variables, with corresponding variables having the same powers. The Distributive Property and properties of equalities can be used to simplify expressions. An expression is in **simplest form** if it is replaced by an **equivalent** expression with no like terms or parentheses.

Example **Simplify $4(a^2 + 3ab) - ab$.**

$4(a^2 + 3ab) - ab$	$= 4(a^2 + 3ab) - 1ab$	Multiplicative Identity
	$= 4a^2 + 12ab - 1ab$	Distributive Property
	$= 4a^2 + (12 - 1)ab$	Distributive Property
	$= 4a^2 + 11ab$	Substitution

Exercises

Simplify each expression. If not possible, write *simplified*.

1. $12a - a$ 11a
2. $3x + 6x$ 9x
3. $3x - 1$ simplified
4. $20a + 12a - 8$ 32a-8
5. $3x^2 + 2x^2$ $5x^2$
6. $-6x + 3x^2 + 10x^2$ $13x^2-6x$
7. $2p + \frac{1}{2}q$ simplified
8. $10xy - 4(xy + xy)$ 2xy
9. $21a + 18a + 31b - 3b$ 39a+28b
10. $4x + \frac{1}{4}(16x - 20y)$ 8x-5y
11. $2 - 1 - 6x + x^2$ x^2-6x+1
12. $4x^2 + 3x^2 + 2x$ $7x^2+2x$

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used.

13. six times the difference of $2a$ and b, increased by $4b$

$6(2a-b)+4b$ Dist
$12a-6b+4b$ sub.
$12a-2b$

14. two times the sum of x squared and y squared, increased by three times the sum of x squared and y squared

$2(x^2+y^2)+3(x^2+y^2)$ Dist.
$2x^2+2y^2+3x^2+3y^2$ sub.
$5x^2+5y^2$

Lesson 1-4

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1-4 Skills Practice

The Distributive Property

Use the Distributive Property to rewrite each expression. Then evaluate.

1. $4(3 + 5)$

2. $2(6 + 10)$

3. $5(7 - 4)$

4. $(6 - 2)8$

5. $5 \cdot 89$

6. $9 \cdot 99$

7. $15 \cdot 104$

8. $15\left(2\frac{1}{3}\right)$

Use the Distributive Property to rewrite each expression. Then evaluate.

9. $(a + 7)2$

10. $7(h - 10)$

11. $3(m + n)$

12. $2(x - y + 1)$

Simplify each expression. If not possible, write *simplified*.

13. $2x + 8x$

14. $17g + g$

15. $2x^2 + 6x^2$

16. $7a^2 - 2a^2$

17. $3y^2 - 2y$

18. $2(n + 2n)$

19. $4(2b - b)$

20. $3q^2 + q - q^2$

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used.

21. The product of 9 and t squared, increased by the sum of the square of t and 2

22. 3 times the sum of r and d squared minus 2 times the sum of r and d squared

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1-4 Practice

The Distributive Property

Use the Distributive Property to rewrite each expression. Then evaluate.

1. $9(7 + 8)$
2. $7(6 - 4)$
3. $(4 + 6)11$
4. $9 \cdot 499$
5. $7 \cdot 110$
6. $16\left(4\frac{1}{4}\right)$

Use the Distributive property to rewrite each expression. Then simplify.

7. $(9 - p)3$
8. $(5y - 3)7$
9. $15(f + \frac{1}{3})$
10. $16(3b - 0.25)$
11. $m(n + 4)$
12. $(c - 4)d$

Simplify each expression. If not possible, write *simplified*.

13. $w + 14w - 6w$
14. $3(5 + 6h)$
15. $12b^2 + 9b^2$
16. $25t^3 - 17t^3$
17. $3a^2 + 6a + 2b^2$
18. $4(6p + 2q - 2p)$

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used.

19. 4 times the difference of f squared and g, increased by the sum of f squared and $2g$

20. 3 times the sum of x and y squared plus 5 times the difference of $2x$ and y

21. **DINING OUT** The Ross family recently dined at an Italian restaurant. Each of the four family members ordered a pasta dish that cost \$11.50, a drink that cost \$1.50, and dessert that cost \$2.75.

    a. Write an expression that could be used to calculate the cost of the Ross' dinner before adding tax and a tip.

    b. What was the cost of dining out for the Ross family?