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The Distributive Property

# THE DISTRIBUTIVE PROPERTY

## Students will be able to:

use the distributive property, and  
simplify expressions by combining like terms.

## Key Vocabulary:

- Term
- Like Terms
- Coefficient
- Simplest Form

# THE DISTRIBUTIVE PROPERTY

## DISTRIBUTIVE PROPERTY

*For any numbers  $a, b$ , and  $c$ , the product of  $a$  and  $(b + c)$  is:*

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

$$(b + c)a = ba + ca$$

*For any numbers  $a, b$ , and  $c$ , the product of  $a$  and  $(b - c)$  is:*

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

$$(b - c)a = ba - ca$$

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**Sample Problem 1:** Rewrite using the distributive property, then evaluate.

$$\text{a. } 8(10 + 4) = 8 \cdot 10 + 8 \cdot 4 = 80 + 32 = 112$$

$$\text{b. } (5 + 7)12 = 5 \cdot 12 + 7 \cdot 12 = 50 + 84 = 134$$

$$\text{c. } 5(100 - 72) = 5 \cdot 100 - 5 \cdot 72 = 500 - 360 = 140$$

$$\text{d. } \left(2 + \frac{1}{5}\right)35 = 2 \cdot 35 + \frac{1}{5} \cdot 35 = 70 + 7 = 77$$

$$\text{e. } (10 + 7)5 = 10 \cdot 5 + 7 \cdot 5 = 50 + 35 = 85$$

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**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 power.

## **SIMPLIFYING EXPRESSIONS:**

Distributive property is used to combine like terms by adding their coefficients. A simplified expression must not have grouping symbols and fractions are reduced to its lowest term.

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**Sample Problem 2:** Simplify.

a.  $18x + 3x$

b.  $5x^2 + 2 - x^2$

c.  $3 - 2(4 + x)$

d.  $-3(2x^2 + 4x - 1) + 5x$

e.  $5(x - 7y) + 8(3x + 2y)$

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## Sample Problem 2: Simplify.

$$\text{a. } 18x + 3x = 21x$$

$$\text{b. } 5x^2 + 2 - x^2 = 4x^2 + 2$$

$$\text{c. } 3 - 2(4 + x) = 3 - 2(4) - 2(x) = 3 - 8 - 2x = -5 - 2x$$

$$\begin{aligned} \text{d. } -3(2x^2 + 4x - 1) + 5x &= -3(2x^2) - 3(4x) - 3(-1) + 5x \\ &= -6x^2 - 12x + 3 + 5x \\ &= -6x^2 - 7x + 3 \end{aligned}$$

$$\begin{aligned} \text{e. } 5(x - 7y) + 8(3x + 2y) &= 5(x) - 5(7y) + 8(3x) + 8(2y) \\ &= 5x - 35y + 24x + 16y \\ &= 29x - 19y \end{aligned}$$

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**Sample Problem 3:** Manny runs a restaurant. One day, a total of 50 steaks are sold. Each steak cost \$14.95 and received an average tip of \$1 for each. Write the expression that determines the total amount he earned. How much did Manny earned?



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**Sample Problem 3:** Manny runs a restaurant. One day, a total of 50 steaks are sold. Each steak cost \$14.95 and received an average tip of \$1 for each. Write the expression that determines the total amount he earned. How much did Manny earned?

$$50(14.95 + 1)$$

$$= 50(15.95)$$

$$= \$797.5$$