

Sec. 1-7 The Distributive Property

Vocabulary

- Distributive Property of Multiplication Over Addition

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

- term: a number, a variable, or the product of a number and variables

- constant: has no variable

- coefficient: number in front of the variable(s)

$$4x + 6x = (4+6)x = 10x$$

- like terms: everything after the coefficient is the same

Combine like terms

- ① Add the coefficients
- ② Keep the term

$$\begin{aligned} & 8x + 3x \\ & (8+3)x \\ & 11x \end{aligned}$$

$$\begin{aligned} & 2(2+3) = 2 \cdot 2 + 2 \cdot 3 \\ & 2(5) = 4+6 \\ & 10 = 10 \end{aligned}$$

Problem 1: Simplify

$$a. 4(x+5) = 4 \cdot x + 4 \cdot 5 = 4x + 20$$

$$b. (4b-1)(-6) = -6 \cdot 4b + (-6)(-1) \\ -24b + 6$$

$$c. 5(x+7) = 5 \cdot x + 5 \cdot 7 = 5x + 35$$

$$d. (2y-1)(-7) = -7(2y) + (-7)(-1) \\ -14y + 7$$

Problem 2: Write as a sum or difference.

$$a. \frac{3x+1}{5} = (3x+1) \cdot \left(\frac{1}{5}\right) = \frac{3x}{5} + \frac{1}{5} \quad \text{Note } \frac{4}{3}x = \frac{4x}{3}$$

$$b. \frac{4x-16}{3} = (4x-16) \cdot \left(\frac{1}{3}\right) = \frac{4x}{3} - \frac{16}{3}$$

$$c. \frac{15+6x}{12} = \frac{\overset{3 \cdot 5}{15}}{\underset{3 \cdot 4}{12}} + \frac{6x}{12} = \frac{5}{4} + \frac{1}{2}x \text{ or } \frac{5}{4} + \frac{x}{2}$$

$$d. \frac{14+9x}{7} = \frac{\overset{2 \cdot 7}{14}}{\underset{1 \cdot 7}{7}} + \frac{9x}{7} = 2 + \frac{9x}{7} \text{ or } 2 + \frac{9}{7}x$$

Problem 3: Simplify

$$a. -1(3m-4n) = -1 \cdot 3m + (-1)(-4n) \\ -3m + 4n$$

$$b. -(6p+7) = -6p-7$$

Problem 4: Deli sandwiches cost \$3.95 each. What is the total cost of 6 sandwiches? Use mental math.

$$\begin{aligned} &6(4.00 - 0.05) \\ &6(4.00) - 6(0.05) \\ &24 - (0.30) \\ &\$23.70 \end{aligned}$$

$$\begin{aligned} 98 \cdot 7 &= (100 - 2)(7) \\ &7 \cdot 100 - 2 \cdot 7 \\ &700 - 14 \\ &686 \end{aligned}$$

$$\begin{aligned} 59 \cdot 5 &= 60 \cdot 5 - 1 \cdot 5 \\ (60 - 1) \cdot 5 &\rightarrow 300 - 5 \\ &295 \end{aligned}$$

Problem 5: Simplify

- Add coefficients
- Keep "like" term.

a. $5x^2 + 7x^2$

$$\begin{aligned} &(5+7)x^2 \\ &12x^2 \end{aligned}$$

b. $7x - 5 - 3x + 2y + 1$

$$\begin{aligned} &(7-3)x + 2y + (-5+1) \\ &4x + 2y - 4 \end{aligned}$$

c. $3y - 1y = (3-1)y = 2y$

d. $-7mn^4 - 5mn^4$

$$(-7-5)mn^4 = -12mn^4$$

e. $7y^3z - 6yz^3 + 1y^3z$

$$\begin{aligned} &(7+1)y^3z - 6yz^3 \\ &8y^3z - 6yz^3 \end{aligned}$$

$8x^2 - 2x^4 - 2x + 2 + xy$
Simplified already - no like terms

