**The Distributive Property** Guide Notes

**DISTRIBUTIVE PROPERTY**

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

\[
a(b + c) = ab + ac \quad \quad \quad (b + c)a = ba + ca
\]

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

\[
a(b - c) = ab - ac \quad \quad \quad (b - c)a = ba - ca
\]

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

a. \( 8(10 + 4) \)
   \[= 8 \cdot 10 + 8 \cdot 4 \]
   \[= 80 + 32 \]
   \[= 112 \]

b. \( (5 + 7)12 \)
   \[= 5 \cdot 12 + 7 \cdot 12 \]
   \[= 50 + 84 \]
   \[= 134 \]

c. \( 5(100 - 72) \)
   \[= 5 \cdot 100 - 5 \cdot 72 \]
   \[= 500 - 360 \]
   \[= 140 \]

d. \( (2 + \frac{1}{5})35 \)
   \[= 2 \cdot 35 + \frac{1}{5} \cdot 35 \]
   \[= 70 + 7 \]
   \[= 77 \]

e. \( (10 + 7)5 \)
   \[= 10 \cdot 5 + 7 \cdot 5 \]
   \[= 50 + 35 \]
   \[= 85 \]

**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.

**Sample Problem 2:** Simplify.

a. \( 18x + 3x \)
   \[= 21x \]

b. \( 5x^2 + 2 - x^2 \)
   \[= 4x^2 + 2 \]

c. \( 3 - 2(4 + x) \)
   \[= 3 - 2(4) - 2(x) \]
   \[= 3 - 8 - 2x \]
   \[= -5 - 2x \]

d. \( -3(2x^2 + 4x - 1) + 5x \)
   \[= -3(2x^2) - 3(4x) - 3(-1) + 5x \]
   \[= -6x^2 - 12x + 3 + 5x \]
   \[= -6x^2 - 7x + 3 \]

e. \( 5(x - 7y) + 8(3x + 2y) \)
   \[= 5(x) - 5(7y) + 8(3x) + 8(2y) \]
   \[= 5x - 35y + 24x + 16y \]
   \[= 29x - 19y \]

**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?

\[
50(14.95 + 1) \\
= 50(15.95) \\
= 797.5
\]