Section 2.6 Simplifying Algebraic Expressions

1. Simplifying Algebraic Expressions Using the Associative Property: Use the associative property to regroup the multiplication or addition expression so that like factors or terms are together and can be simplified.

Example: Simplify each of the following by first regrouping using the associative property of addition or the associative property of multiplication.

a. $8(4a)$

b. $(-8)(-2a)$

c. $(-3a)(-10a)$

d. $14 + (-10 + 8a)$

e. $-15 + (2x + 5)$

f. $-3 + (2x - 7)$

2. Simplifying Algebraic Expressions Using the Distributive Property: Recall the distributive property: $a(b + c) = ab + ac$. We can expand the property to subtraction since we know that subtraction is addition of the opposite. So

$$\text{Proof:} \quad a(b - c) = a(b + (-c))$$
$$= ab + a(-c))$$
$$= ab + (-ac)$$
$$= ab - ac$$

Example: Use the distributive property to simplify.

a. $5(2x + 7)$

b. $10(3a - 8)$

c. $-2(3a + 8)$

3. Adding or Subtracting Similar Terms: Two terms (addends in an addition expression) are similar if their variable parts are identical. Such terms can be added or subtracted by applying the distributive property. In the answer, the common variable part remains unchanged, but the numbers in front of the variable parts are added or subtracted.

Example: Simplify each of the following.

a. $4x + 3x = (4 + 3)x = 7x$

b. $8a + 10a$

c. $3a - 5a = (3 - 5)a = -2a$

d. $11a - 15a$

e. $3a + 17 + 5a$

Note: Portions of this document are excerpted from the textbook *Prealgebra,* 7th ed. by Charles McKeague