Lesson 3-2

Example 1 Identify Parts of Expressions

Identify the terms, like terms, coefficients, and constants in the expression $x + 5y - 2y - 3$.

$x + 5y - 2y - 3 = 1x + 5y + (-2y) + (-3)$ Definition of subtraction

terms: x, $5y$, $-2y$, -3 like terms: $5y$, $-2y$

coefficients: 1, 5, -2 constant: -3

Example 2 Simplify Algebraic Expressions

Simplify each expression.

a. $4b + 7b$

$4b$ and $7b$ are like terms.

$4b + 7b = (4 + 7)b$ Distributive Property

$= 11b$ Simplify.

b. $3x + 9 + 4x$

$3x$ and $4x$ are like terms.

$3x + 9 + 4x = 3x + 4x + 9$ Commutative Property

$= (3 + 4)x + 9$ Distributive Property

$= 7x + 9$ Simplify.

c. $5m + 2 - 9m - 6$

$5m$ and $-9m$ are like terms. 2 and -6 are also like terms.

$5m + 2 - 9m - 6 = 5m + 2 + (-9m) + (-6)$ Definition of subtraction

$= 5m + (-9m) + 2 + (-6)$ Commutative Property

$= [5 + (-9)]m + 2 + (-6)$ Distributive Property

$= -4m + (-4)$ Simplify.

$= -4m - 4$ Definition of subtraction

d. $a + 5(2a + 3b)$

$a + 5(2a + 3b) = a + 5(2a) + 5(3b)$ Distributive Property

$= a + 10a + 15b$ Associative Property

$= 1a + 10a + 15b$ Identity Property

$= (1 + 10)a + 15b$ Distributive Property

$= 11a + 15b$ Simplify.

Example 3 **Translate Verbal Phrases into Expressions**

AGES **Emily and Kate are sisters. Emily is four years younger than Kate. Write an expression in simplest form that represents the sum of Emily and Kate's ages.**

Words Kate has a certain age. Emily is four years younger.

Variables Let x = Kate's age.
Let $x - 4$ = Emily's age.

Expression To find the sum, add the expressions.

$$x + (x - 4) = (x + x) - 4 \quad \text{Associative Property}$$
$$= (1x + 1x) - 4 \quad \text{Identity Property}$$
$$= (1 + 1)x - 4 \quad \text{Distributive Property}$$
$$= 2x - 4 \quad \text{Simplify.}$$

The expression $2x - 4$ represents the sum of Emily and Kate's ages, where x is Kate's age.