

Simplifying Algebraic Expressions

Parts of an algebraic expression are called *terms*. **Like terms** are terms that have the same variables raised to the same exponents. Constant terms are also like terms.

An algebraic expression is in **simplest form** when it has no like terms and no parentheses. To *combine* like terms that have variables, use the Distributive Property to add or subtract the coefficients.

Example 1 Simplify $8y + 7y$.

$$\begin{aligned} 8y + 7y &= (8 + 7)y \\ &= 15y \end{aligned}$$

Distributive Property

Add coefficients.

Example 2 Simplify $2(x + 5) - 3(x - 2)$.

$$\begin{aligned} 2(x + 5) - 3(x - 2) &= 2(x) + 2(5) - 3(x) - 3(-2) \\ &= 2x + 10 - 3x + 6 \\ &= 2x - 3x + 10 + 6 \\ &= -x + 16 \end{aligned}$$

Distributive Property

Multiply.

Group like terms.

Combine like terms.

Example 3 Simplify $xy + 3y - 2x + 5y - 3xy$.

$$\begin{aligned} xy + 3y - 2x + 5y - 3xy &= xy - 3xy + 3y + 5y - 2x \\ &= -2xy + 8y - 2x \end{aligned}$$

Group like terms.

Combine like terms.

Practice

Check your answers at BigIdeasMath.com.

Simplify the expression.

- $7x + 15x$
 $22x$
 - $8y - 14y$
 $-6y$
 - $7d + 9 - 5d$
 $2d + 9$
 - $3w + 2(2 - 3w) + 2$
 $-3w + 6$
 - $(x + 3) + (3x - 7)$
 $4x - 4$
 - $(5k + 6) + (4k - 8)$
 $9k - 2$
 - $(-7n + 6) + (5n + 15)$
 $-2n + 21$
 - $(9z + 12) - (6z + 8)$
 $3z + 4$
 - $(8b + 1) - (-10b - 5)$
 $18b + 6$
 - $s(8 - 2t) + 3t(4 - 2s) + 5t$
 $-8st + 8s + 17t$
 - $qr + 2q^2 - 3qr - r^2 - 6q^2$
 $-4q^2 - 2qr - r^2$
 - $g^3(h - 4g) - h(3 - 2g^3)$
 $-4g^4 + 3g^3h - 3h$
- 13. EARNINGS** The original price of a model car is d dollars. You use a coupon and buy the kit for $(d - 10)$ dollars. You assemble the model car and sell it for $(2d - 20)$ dollars. Write an expression that represents your earnings. Interpret the expression.
 $(d - 10)$; You earn $(d - 10)$ dollars. You also paid $(d - 10)$ dollars, so you doubled your money by selling the model car for twice as much as you paid for the kit.