2.5b Algebraic Expressions



Parts of an algebraic expression are called terms. **Like terms** are terms that have the same variables raised to the same exponents. A term without a variable, such as 4, is called a *constant*. Constant terms are also like terms.

Like Terms	Unlike Terms
3 and −4	x and 5
-2x and $7x$	2 <i>x</i> and −6 <i>y</i>

EXAMPLE

Identifying Terms and Like Terms

Identify the terms and like terms in each expression.

a.
$$9x - 2 + 7 - x$$

$$9x - 2 + 7 - x$$

Terms:
$$9x, -2, 7, -x$$

b.
$$6 + 5z - 3z + z$$

$$6+5z-3z+z$$

Terms: 6,
$$5z$$
, $-3z$, z

Same variable raised to same exponent

Like terms: 9x and -x, -2 and 7

Like terms: 5z, -3z, and z

Remember



The numerical factor of a term that contains a variable is a coefficient.

An algebraic expression is in **simplest form** if 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.

Simplifying Algebraic Expressions **EXAMPLE**

Simplify
$$\frac{3}{4}y + 12 - \frac{1}{2}y - 6$$
.

 $\frac{3}{4}y$ and $-\frac{1}{2}y$ are like terms. 12 and -6 are also like terms.

$$\frac{3}{4}y + 12 - \frac{1}{2}y - 6 = \frac{3}{4}y - \frac{1}{2}y + 12 - 6$$

$$= \left(\frac{3}{4} - \frac{1}{2}\right)y + 12 - 6$$
Commutative Property

 $=\frac{1}{4}y+6$

Simplify.

Practice

Identify the terms and like terms in the expression.

1.
$$y + 10 - \frac{3}{2}y$$

2.
$$2r + 7r - r - 9$$

3.
$$7 + 4p - 5 + p + 2q$$

Commutative Property of Addition

Simplify the expression.

4.
$$2.5x + 4.3x - 5$$

5.
$$\frac{3}{8}b - \frac{3}{4}b$$

6.
$$14 - 3z + 8 + z$$

EXAMPLE

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Standardized Test Practice

Which expression is equivalent to 5(n-8) + 4n?

(A) 49*n*

(B) 9n + 40

(C) 9n - 40

(D) 5n - 40

5(n-8) + 4n = 5(n) - 5(8) + 4n

=5n-40+4n

Multiply.

=5n+4n-40

Commutative Property of Addition

= (5+4)n - 40

Distributive Property

Distributive Property

= 9n - 40

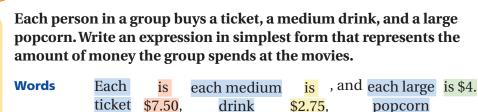
Add coefficients.

ightharpoonup The correct answer is ightharpoonup.

EXAMPLE



Real-Life Application





Variable

The same number of each item is purchased. So, *x* can represent the number of tickets, the number of medium drinks, and the number of large popcorns.

Study Tip

In Example 4, rewriting 7.50x + 2.75x + 4x as 14.25x helps you conclude that the total cost per person is \$14.25.

Expression

2.75 x

+

4x

$$7.50x + 2.75x + 4x = (7.50 + 2.75 + 4)x$$
$$= 14.25x$$

Add coefficients.

Distributive Property

 \therefore The expression 14.25*x* represents the amount of money the group spends at the movies.

Practice

Simplify the expression.

7.
$$3(q+1)-1$$

8.
$$7x + 4\left(\frac{3}{4}x - \frac{1}{4}\right)$$

9.
$$2(g+4)+5(g-1)$$

10. WHAT IF? In Example 4, each person buys a ticket, a large drink, and a small popcorn. How does the expression change? Explain.