

Objectives: The students will be able to combine like terms to simplify variable expressions.

# Combining Like Terms

In an expression, the **terms** are the elements separated by the plus or minus sign. A **coefficient** is the number being multiplied by a variable.

3 is the coefficient

3 a

a is the variable

3a is a term.

b is a term.

-5 is a term.

3a + b + -5

-5 is a constant b/c there is no variable beside it.

**Like terms** have the same variable(s).

$$2x + 3y + 4x + 5y$$

2x and 4x are like terms.  
3y and 5y are like terms.

You can add like terms by adding their coefficients.  
 $2x + 4x = 6x$  and  $3y + (-5y) = -2y$   
 So you can simplify  $2x + 3y + 4x - 5y = 6x + -2y$

## Practice

**Problem 1.**  $2x + 3y + z$

- a) What number is the coefficient of x? 2  
 b) What number is the coefficient of y? 3  
 c) What number is the coefficient of z? 1

Typically, you do not write the coefficients 1 or -1.  
 $1x = x$   
 $-1x = -x$

**Problem 2.**  $5x + 4y - z$  (hint: change the subtraction to plus the opposite)

- a) What number is the coefficient of x? 5  
 b) What number is the coefficient of y? -4  
 c) What number is the coefficient of z? -1



**Problem 3.** Add like terms.

- a)  $6x + 2x = 8x$   
 b)  $6x - 2x = 4x$   
 c)  $5x + 1x = 6x$  (the opposite of x)  
 d)  $5x + 1x = 4x$   
 e)  $-4x + 5x = x$   
 f)  $4x + 5x = 9x$   
 g)  $-5x + 3x = -2x$   
 h)  $-x + x = 0$   
 i)  $-7x + (+7x) = 0$   
 j)  $-3x + 4 + 2x + 6 = -x + 10$   
 k)  $x + 2 + 4x + 5 = 5x + 7$   
 l)  $4x + y + 2x + 3z = 6x + y + 3z$   
 m)  $3x + 7y + 8x + 2y = 11x + 9y$   
 n)  $\frac{3}{5}x + \frac{1}{9}y + \frac{3}{4}x = \frac{27}{20}x + \frac{1}{9}y$   
 o)  $\frac{5}{4}p + \frac{2}{3} - \frac{1}{4}p = p + \frac{2}{3}$   
 p)  $-\frac{1}{7}a + \frac{5}{6}a - \frac{2}{3} = \frac{29}{42}a - \frac{2}{3}$   
 q)  $-\frac{2}{3}x + (+\frac{1}{5}x) + (-\frac{7}{9}) = -\frac{7}{15}x + \frac{1}{9}$   
 r)  $-\frac{10}{15}x + \frac{3}{15}x = -\frac{7}{15}x$

Objectives: The students will be able to solve problems by multiplying and dividing integers.

# Multiplying and Dividing Integers

Rules for multiplying & dividing integers:

If the signs are the same: positive

If the signs are different: negative

## Practice

Multiplication answer is a product.  
Division answer is a quotient.

Simplify.

- 1.  $-6 \cdot (-2)$  12
- 2.  $5 \cdot -3$  -15
- 3.  $3 \cdot -5$  -15
- 4.  $-2 \cdot -3$  6
- 5.  $5 \div (-1)$  -5
- 6.  $-24 \div -3$  8
- 7.  $3 \cdot (-10)$  -30
- 8.  $\frac{-36}{-9}$  4
- 9.  $-6 \cdot 4$  -24
- 10.  $-2 \cdot 10 \cdot (-4)$  80
- 11.  $10 \cdot (-6) \cdot (-2) \cdot (5)$  600
- 12.  $\frac{54}{-6}$  -9

Objectives: The students will be able to use the distributive property to simplify variable expressions.

## Distributive Property

According to the **Distributive Property**, you **distribute** or "pass out" a multiplication to each part of a sum or difference in parentheses.

In  $2(a + 3) = 2a + 6$ , we "pass out" the 2 by multiplying it by both the a and the 3.

Multiply  $6(x + 9)$   
 $6(x) + 6(9)$   
 $6x + 54$

optionally  $\rightarrow$  Multiply  $-3(h + 2)$   
 $-3(h) + -3(2)$   
 $-3h + -6$

Algebraic

### Arithmetic

Order of Operations

$$\begin{aligned} &7(6 - 4) \\ &7(2) \\ &\boxed{14} \end{aligned}$$

Distributive property

$$\begin{aligned} &7(6 - 4) \\ &7(6) - 7(4) \\ &42 - 28 \\ &\boxed{14} \end{aligned}$$

$$\begin{aligned} &-2(x + 4) \\ &-2(x) + -2(4) \\ &\boxed{-2x + -8} \end{aligned}$$

### Practice

Use the distributive property to simplify.

- 1.  $4(j + 10)$   $4j + 40$
- 3.  $-2(-9 + 4)$   $29 + 8$
- $-12p + 42$

- 2.  $-1(4n + 6)$   $-4n + 6$
- 4.  $(4c + 2)3$   $12c + 6$
- 6.  $5(2r + 4)$   $10r + 20$