

Lesson 11-2

Example 1

Simplify.

a. $(4x)(3y)$

b. $(-3a)(-7b)$

c. $(5m)(-6m^2)$

Solution

a. $(4x)(3y) = (4)(x)(3)(y) = (4)(3)(x)(y) = 12xy$

b. $(-3a)(-7b) = (-3)(a)(-7)(b) = (-3)(-7)(a)(b) = 21ab$

c. $(5m)(-6m^2) = (5)(m)(-6)(m^2) = (5)(-6)(m)(m^2) = -30m^3$

Example 2

ADVERTISING To promote a new product, a company buys $3y$ minutes of airtime. The cost of one minute of airtime is $2y + 3$. Multiply to find an expression which represents the cost of advertising the new product on television.

Solution

$$3y(2y + 3) = (3y)(2y) + (3y)(3) = 6y^2 + 9y$$

Example 3

Simplify.

a. $2w^2(3w^2 + w - 3)$

b. $4(3x^2w - 2xw^2 + xw - 7)$

Solution

$$\begin{aligned} \text{a. } 2w^2(3w^2 + w - 3) &= (2w^2)(3w^2) + (2w^2)(w) + (2w^2)(-3) \\ &= 6w^4 + 2w^3 - 6w^2 \end{aligned}$$

$$\begin{aligned} \text{b. } 4(3x^2w - 2xw^2 + xw - 7) &= 4(3x^2w) + 4(-2xw^2) + 4(xw) + 4(-7) \\ &= 12x^2w - 8xw^2 + 4xw - 28 \end{aligned}$$

Example 4

GEOMETRY List three possible sides of a rectangle with an area of $24mn^2$.

Solution

As you know, the area of a rectangle is the product of its length and width. To find a complete set of paired factors for the given area, start by analyzing its prime elements. Express the coefficient in prime numbers and separate the variables. The area $24mn^2$ is analyzed as $(2)(2)(2)(3)(m)(n)(n)$.

Now use the analysis to find different factor pairs or sets of sides. Set up a table. The second factor contains all the elements not in the first factor.

First factor/side

$$\begin{aligned}(2) &= 2 \\ (m) &= m \\ (n) &= n\end{aligned}$$

Second factor/side

$$\begin{aligned}(2)(2)(3)(m)(n)(n) &= 12mn^2 \\ (2)(2)(2)(3)(n)(n) &= 24n^2 \\ (2)(2)(2)(3)(m)(n) &= 24mn\end{aligned}$$

There are many possible sets of factors.