

## Lesson 9-7

## Example 1

Factor each polynomial.

a.  $8m + 6$

b.  $6b^2 - 18b^4$

c.  $10x^2y^2 - 15xy^2 + 25x^4y$

## Solution

- a. Find the GCF of
- $8m$
- and
- $6$
- .

$$8m = 2 \cdot 2 \cdot 2 \cdot m$$

$$6 = 2 \cdot 3$$

The GCF is  $2$ .

Use the GCF and the distributive property to rewrite the polynomial.

$$\begin{aligned} 8m + 6 &= 2 \cdot 4m + 2 \cdot 3 \\ &= 2(4m + 3) \end{aligned}$$

So,  $8m + 6 = 2(4m + 3)$ .

Check by multiplying.

$$2(4m + 3) = 2(4m) + 2(3) = 8m + 6$$

- b. Find the GCF of
- $6b^2$
- and
- $18b^4$
- .

$$6b^2 = 2 \cdot 3 \cdot b^2$$

$$18b^4 = 2 \cdot 3^2 \cdot b^4$$

The GCF is  $2 \cdot 3 \cdot b^2$ , or  $6b^2$ .

So,  $6b^2 - 18b^4 = 6b^2(1 - 3b^2)$ .

Check:  $6b^2(1 - 3b^2) = 6b^2(1) + 6b^2(-3b^2) = 6b^2 - 18b^4$

- c. Find the GCF for the three terms.

$$10x^2y^2 = 2 \cdot 5 \cdot x^2 \cdot y^2$$

$$15xy^2 = 3 \cdot 5 \cdot xy^2$$

$$25x^4y = 5^2 \cdot x^4y$$

The GCF is  $5xy$ .

So,  $10x^2y^2 - 15xy^2 + 25x^4y = 5xy(2xy - 3y + 5x^3)$ .

Check:  $5xy(2xy - 3y + 5x^3) = 10x^2y^2 - 15xy^2 + 25x^4y$

**Example 2**

The formula for the surface area ( $SA$ ) of a right cylinder with radius  $r$  and height  $h$  is  $SA = 2\pi rh + 2\pi r^2$ . Rewrite the formula by factoring.

**Solution**

The GCF of  $2\pi rh$  and  $2\pi r^2$  is  $2\pi r$ .

$$2\pi rh + 2\pi r^2 = 2\pi r(h + r)$$

So,  $SA = 2\pi r(h + r)$ .

**Example 3**

**MODELING** Use Algeblocks to factor  $2xy - 4x^2$ .

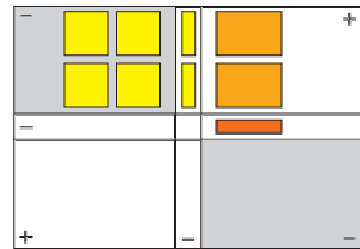
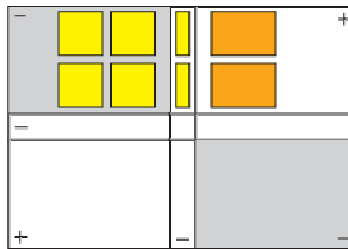
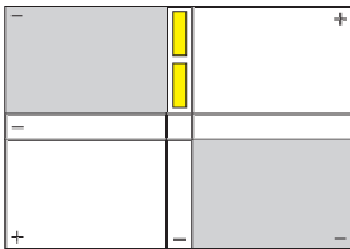
**Solution**

*Step 1* Form rectangular areas of  $2xy$  and  $4x^2$  having one side as  $2x$ , the GCF.

*Step 2* Place the GCF,  $2x$ , on the vertical axis.

*Step 3* Put the rectangular areas in the proper quadrant with the GCF as a boundary.

*Step 4* Divide by making another boundary. The two boundaries are the factors.



So,  $2xy - 4x^2 = 2x(y - 2x)$ .