Looking Ahead

The skills you have reviewed in this section are the foundation to the process for finding x-intercepts of a quadratic function, as the following example shows.

Example Preview

Find the x-intercepts, if any, of the graph of the following function.

$$f(x) = -3x^2 - 6x$$

Solution

Since the x-intercepts are the points on the x-axis where $f(x) = 0$, we need to solve the following equation.

$$-3x^2 - 6x = 0$$

At this point, we need to recognize that both of the terms on the left side of this quadratic equation have a common factor of $-3x$. So, this quadratic equation can be solved in the following manner.

$$\begin{aligned} -3x^2 - 6x &= 0 \\ -3x(x+2) &= 0 \\ -3x = 0,\ x+2 &= 0 \\ x = 0, \qquad x &= -2 \end{aligned}$$

Therefore, the parabola, which is the graph represented by this quadratic function, crosses the x-axis at $(-2,0)$ and $(0,0)$.

4.R.4 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. When finding the GCF of a polynomial, you need to consider only the coefficients.

2. An expression is factored completely if none of its factors can be factored.

3. One way to find the GCF of a set of numbers is to use the prime factorization of each number.

4. Binomials cannot be factored out of algebraic expressions.

Practice

Find the GCF for each set of terms.

5. $\{25, 30, 75\}$

6. $\{8a^3, 16a^4, 20a^2\}$

Factor each polynomial by finding the GCF (or –1 · GCF).

7. $14x + 21$

8. $10x^2y - 25xy$

Factor each of the polynomials by grouping. If a polynomial cannot be factored, write "not factorable."

9. $3x + 3y + ax + ay$

10. $10xy - 2y^2 + 7yz - 35xz$

Applications

Solve.

11. ***Projectile Motion:*** A circus performer is shot vertically into the air with an initial velocity of 48 feet per second. The height of the performer above the ground in feet can be described by the polynomial $48x - 16x^2$ after x seconds.

a. Find the height of the circus performer after 2 seconds.

b. Factor the polynomial $48x - 16x^2$.

c. Use the factored form of the polynomial from Part **b.** to find the height of the circus performer after 2 seconds.

d. Are the answers from Parts **a.** and **c.** the same? Explain why or why not.

Writing & Thinking

12. Explain why the GCF of $-3x^2 + 3$ is 3 and not -3.