KEY IDEA

Zero-Product Property

Words If the product of two expressions is zero, then one or both of the expressions equal zero.

Algebra If A and B are expressions and $AB = 0$, then $A = 0$ or $B = 0$.

Solve each equation using the zero product property.

$$(2x + 3)(x - 4) = 0$$

Solve each equation using the zero product property.

$$x(x + 6) = 0$$

Solve each equation by factoring.

$$x^2 + 5x - 24 = 0$$

Solve each equation by factoring.

$$x^2 - 4x = 45$$

Solve each equation by factoring.

$$x^2 + 35 = -12x$$

Solve each equation by factoring.

$$x^2 - 25 = 0$$

Solve each equation by factoring.

$$2x^2 - 8x + 6 = 0$$

Solve each equation by factoring.

$$2x^2 - x - 1 = 0$$

Solve each equation by factoring.

$$3x^2 - 5x = 2$$

You know the x-intercepts of the graph of $f(x) = a(x - p)(x - q)$ are p and q. Because the value of the function is zero when $x = p$ and when $x = q$, the numbers p and q are also called *zeros* of the function. A **zero of a function** f is an x-value for which $f(x) = 0$.

Solving Real-Life Problems

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One way to find the maximum value or minimum value of a quadratic function is to first write the function in intercept form $f(x) = a(x - p)(x - q)$. Because the vertex of the function lies on the axis of symmetry, $x = \frac{p + q}{2}$, the maximum value or minimum value occurs at the average of the zeros p and q.

A streaming service company charges $6 per month and has 15 million subscribers. For each $1 increase in price, the company loses 1.5 million subscribers. How much should the company charge to maximize monthly revenue? What is the maximum monthly revenue?