

## Bell Work

Find the zeros by factoring.

$$f(x) = x^2 + 10x + 25$$

## Solving a Polynomial Equation by Factoring

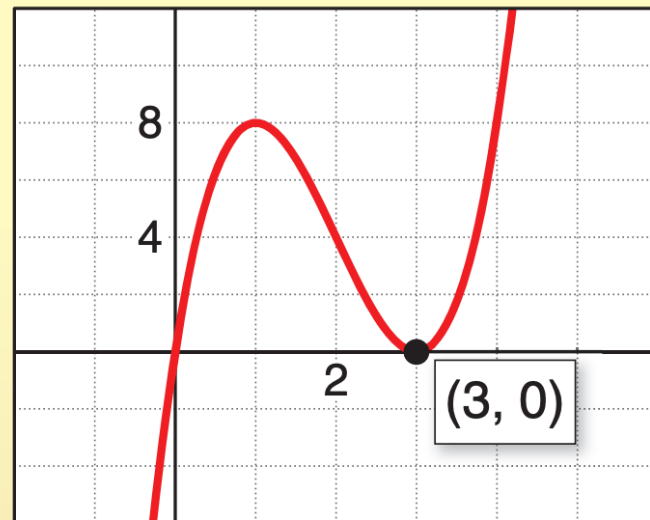
Solve the equation.

$$2x^3 - 12x^2 + 18x = 0$$

In Example 1, the factor  $x - 3$  appears more than once. This creates a **repeated solution** of  $x = 3$ . Note that the graph of the related function touches the  $x$ -axis (but does not cross the  $x$ -axis) at the repeated zero  $x = 3$ , and crosses the  $x$ -axis at the zero  $x = 0$ . This concept can be generalized for a polynomial function  $f$  as follows.

- When a factor  $x - k$  of  $f(x)$  is raised to an odd power, the graph of  $f$  *crosses* the  $x$ -axis at  $x = k$ .
- When a factor  $x - k$  of  $f(x)$  is raised to an even power, the graph of  $f$  *touches* the  $x$ -axis (but does not cross the  $x$ -axis) at  $x = k$ .

## Check



## Solving a Polynomial Equation by Factoring

Solve the equation.

$$4x^4 - 40x^2 + 36 = 0$$

## Solving a Polynomial Equation by Factoring

Solve the equation.

$$-3n^3 + 24n^2 - 48n = 0$$

## Find the Zeros of a Polynomial

Find the zeros then sketch the graph.

$$f(x) = -2x^4 + 16x^2 - 32$$

## Find the Zeros of a Polynomial

Find the zeros then sketch the graph.

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

## Find the Zeros of a Polynomial

Find the zeros then sketch the graph.

$$f(x) = -x^3 - 2x^2 + 9x + 18$$



## Find the Zeros of a Polynomial

Find the zeros then sketch the graph.

$$f(x) = 3x^4 - 6x^2 + 3$$