

# Assignment

## Write

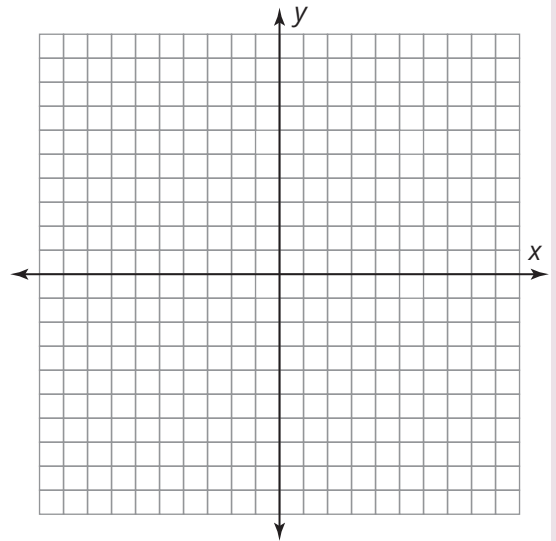
In your own words, explain what the term *multiplicity* means.

## Remember

The Zero Product Property states that if the product of two or more factors is equal to zero, then at least one factor must be equal to zero. The Fundamental Theorem of Algebra states that a degree  $n$  polynomial has, counted with multiplicity, exactly  $n$  zeros.

## Practice

1. Consider the functions  $k(x) = x - 1$ ,  $m(x) = x + 2$ ,  $n(x) = x - 3$ , and  $f(x) = k(x) \cdot m(x) \cdot n(x)$ .
  - a. Graph  $k(x)$ ,  $m(x)$ , and  $n(x)$ .
  - b. Determine the degree of the function  $f(x)$ . Explain your reasoning.
  - c. Determine the zeros of  $f(x)$ . Explain your reasoning.
  - d. Determine the intervals over which the value of  $f(x)$  is positive. Determine the intervals over which the value of  $f(x)$  is negative. Explain your reasoning.
  - e. Sketch  $f(x)$ .



## Stretch

1. Consider the function  $f(x) = 3x^3 + 5x^2 - 16x - 12$ .
  - a. Graph the function.
  - b. Determine the zeros of the function from the graph.
  - c. Rewrite the function into factored form.
  - d. Determine the intervals over which the value of  $f(x)$  is positive. Determine the intervals over which the value of  $f(x)$  is negative. Explain your reasoning.

## Review

1. An open box is to be made from a rectangular piece of cardboard, 30 inches by 24 inches, by cutting equal squares from the corners and turning up the sides.
  - a. Write a function  $V(x)$  to represent the volume of a box in terms of the side length,  $x$ , of the removed squares. Explain your reasoning.
  - b. Represent the function  $V(x)$  using graphing technology. Determine the domain and range of the function and of this problem situation. Explain your reasoning.
2. Write an quadratic equation that includes the the given points.
  - a. vertex  $(4, -3)$ ; point  $(6, -1)$
  - b. points  $(-2, 8)$ ,  $(1, 14)$ , and  $(0, 10)$
3. Solve the equation  $2m^2 - 6m + 14 = 0$ .