

## 5-2 Polynomials, Linear Factors, and Zeros (Part 1)

### Standards

**A2.A.APR.A.2** (formerly A-APR.A.3) Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the function defined by the polynomial.

**A2.F.IF.A.2** (formerly F-IF.B.6) Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

**A2.F.IF.B.5** (formerly F-IF.C.9) Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

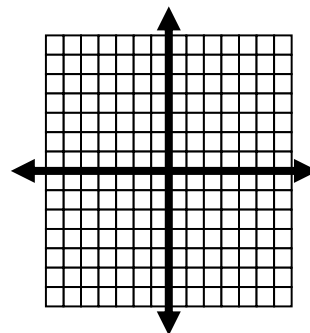
### Key Concepts

The following are equivalent statements about a real number  $b$  and a polynomial  $P(x)$

- $x - b$  is a \_\_\_\_\_ of the polynomial  $P(x)$
- $b$  is a \_\_\_\_\_ of the polynomial function  $y = f(x)$
- $b$  is a \_\_\_\_\_ of the polynomial equation  $f(x) = 0$
- $b$  is an \_\_\_\_\_ of the graph  $y = f(x)$

### Examples

1. (I do) Write  $3x^3 - 18x^2 + 24x$  in factored form.
2. (We do) Find the zeros for  $y = (x - 1)(x + 1)(x + 3)$ . Then graph the function. State the domain and range.



3. (They do) Factor. Then find the zeros.

a.  $y = x^3 - 2x^2 - 15x$

b.  $y = 2x^3 - 5x^2 - 3x$

4. (They do) Write a polynomial with the given zeros.

a.  $-2, -2, 2$

b.  $-3, 1, 2, 3$

5. Given the function  $f(x) = x^2 - 5x - 1$ , determine the average rate of change of the function over the interval  $-2 \leq x \leq 5$

**You do Practice 5-2 Part 1: Complete your assignment on a separate sheet of paper. Show all work.**

1. Find the zeros for each function.

a.  $y = x(x - 6)$

b.  $y = (2x + 3)(x - 1)$

c.  $y = x^3 - 4x^2 - 21x$

2. Write a polynomial function in standard form with the zeros  $x = -2, 1, -1$ .

3. Error Analysis. Your friend says a function with zeros 3 and -1 is  $f(x) = x^2 + 2x - 3$ . Is your friend correct? If not find and correct the error.