

## Section 2.2 Polynomial Functions of Higher Degree

**Objective:** In this lesson you learned how to sketch and analyze graphs of polynomial functions.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Continuous**

**Repeated zero**

**Multiplicity**

**Intermediate Value Theorem**

### I. Graphs of Polynomial Functions (Pages 139–140)

Name two basic features of the graphs of polynomial functions.

- 1)
- 2)

Will the graph of  $g(x) = x^7$  look more like the graph of  $f(x) = x^2$  or the graph of  $f(x) = x^3$ ? Explain.

#### *What you should learn*

How to use transformations to sketch graphs of polynomial functions

### II. The Leading Coefficient Test (Pages 141–142)

State the **Leading Coefficient Test**.

#### *What you should learn*

How to use the Leading Coefficient Test to determine the end behavior of graphs of polynomial functions

**Example 1:** Describe the right-hand and left-hand behavior of the graph of  $f(x) = 1 - 3x^2 - 4x^6$ .

**III. Zeros of Polynomial Functions** (Pages 142–145)

On the graph of a polynomial function, turning points are . . .

Let  $f$  be a polynomial function of degree  $n$ . The graph of  $f$  has, at most, \_\_\_\_\_ turning points. The function  $f$  has, at most, \_\_\_\_\_ real zeros.

Let  $f$  be a polynomial function and let  $a$  be a real number. List four equivalent statements about the real zeros of  $f$ .

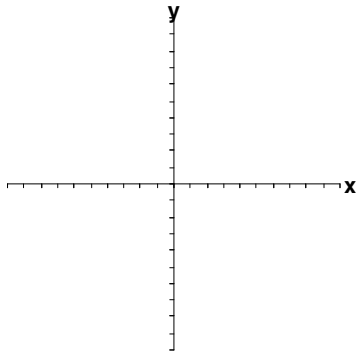
- 1)
- 2)
- 3)
- 4)

If a polynomial function  $f$  has a repeated zero  $x = 3$  with multiplicity 4, the graph of  $f$  \_\_\_\_\_ the  $x$ -axis at  $x = 3$ .

If a polynomial function  $f$  has a repeated zero  $x = 4$  with multiplicity 3, the graph of  $f$  \_\_\_\_\_ the  $x$ -axis at  $x = 4$ .

**Example 2:** Sketch the graph of  $f(x) = \frac{1}{4}x^4 - 2x^2 + 3$ .

***What you should learn***  
 How to find and use zeros of polynomial functions as sketching aids



**IV. The Intermediate Value Theorem** (Pages 146–147)

Explain what the Intermediate Value Theorem implies about a polynomial function  $f$ .

Describe how the Intermediate Value Theorem can help in locating the real zeros of a polynomial function  $f$ .

***What you should learn***  
 How to use the Intermediate Value Theorem to help locate zeros of polynomial functions

**Homework Assignment**

Page(s)

Exercises