GUIDED NOTES – 5.2 POWER FUNCTIONS AND POLYNOMIAL FUNCTIONS

LEARNING OBJECTIVES

In this section, you will:

- Identify power functions.
- Identify end behavior of power functions.
- Identify polynomial functions.
- Identify the degree and leading coefficient of polynomial functions.

IDENTIFYING POWER FUNCTIONS

- A power function is a function that can be represented in the following form:

  $f(x) = $ _____, where k and p are real numbers, and k is known as the coefficient.

  Try It: Read Example 1 in the text, then answer the following.

  Which functions are power functions?

  $$f(x) = 2x^2 \cdot 4x^3 \qquad g(x) = -x^5 + 5x^3 \qquad h(x) = \frac{2x^5 - 1}{3x^2 + 4}$$
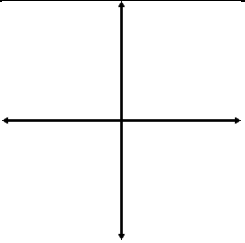
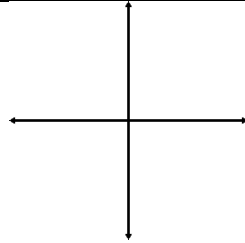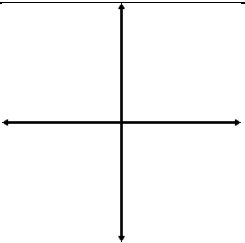## IDENTIFYING END BEHAVIOR OF POWER FUNCTIONS
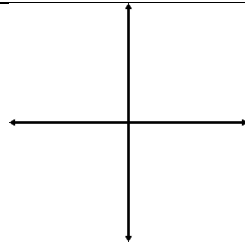
- Write out the 3 step process for identifying the end behavior, given a power function $f(x) = kx^n$ where n is a non-negative integer.

  1.

  2.

  3.

*Use **Figure 4** in you textbook section to fill out the table below.*

	Even Power	Odd Power
Positive Constant $k > 0$	$x \rightarrow -\infty, f(x) \rightarrow$ _____ and $x \rightarrow \infty, f(x) \rightarrow$ _____	$x \rightarrow -\infty, f(x) \rightarrow$ _____ and $x \rightarrow \infty, f(x) \rightarrow$ _____
Negative Constant $k < 0$	$x \rightarrow -\infty, f(x) \rightarrow$ _____ and $x \rightarrow \infty, f(x) \rightarrow$ _____	$x \rightarrow -\infty, f(x) \rightarrow$ _____ and $x \rightarrow \infty, f(x) \rightarrow$ _____

Try It: Read Examples 2 and 3 in the text, then answer the following.

Describe in words and symbols the end behavior of $f(x) = -5x^4$.

IDENTIFYING POLYNOMIAL FUNCTIONS

Study the box in your textbook section titled "polynomial functions."

- Let n be a non-negative integer. A _____ is a function that can be written in the form

$$f(x) = a_n x^n + \cdots + a_2 x^2 + a_1 x + a_0$$

This is called the _____ form of a polynomial function.

IDENTIFYING THE DEGREE AND LEADING COEFFICIENT OF A POLYNOMIAL FUNCTION

- The _____ is the term containing the highest power of the variable. The

    _____ is the coefficient of the leading term.

- Write out the 3 step process for identifying the degree and leading coefficient, given a polynomial function.

    1.

    2.

    3.

    Try It: Read Example 5 in the text, then answer the following.

    Identify the degree, leading term, and leading coefficient of the polynomial $f(x) = 4x^2 - x^6 + 2x - 6$.

Study **Table 3** *in your text to understand how a polynomial's leading term relates to the end behavior of the graph of the function.*

Try It: Read Example 6 in the text, then answer the following.

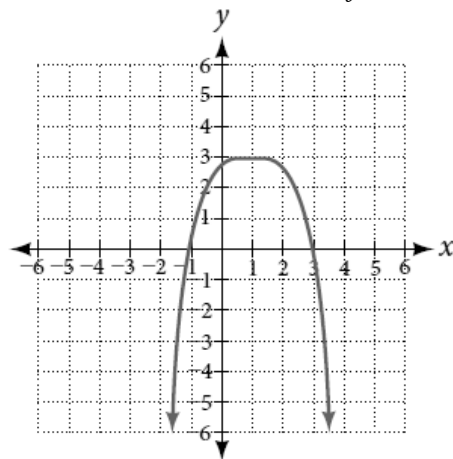Describe the end behavior, and determine a possible degree of the polynomial function in **Figure 8**.

Figure 8

Try It: Read Example 7 in the text, then answer the following.

Given the function $f(x) = -3(x - 2)(x + 1)(x - 5)$, express the function as a polynomial in general form and determine the leading term, degree, and end behavior of the function.

Homework: *You should now be ready to attempt problems 1-3 in "Homework – Section 5.2" on WeBWorK.*

Study the box in your textbook section titled "intercepts and turning points of polynomial functions."

- A _____ of a graph changes direction from increasing to decreasing or decreasing to increasing.

- Write out the 2 step process for determining the intercepts, given a polynomial function.

    1.

    2.

Try It: Read Examples 8 and 9 in the text, then answer the following.

Given the polynomial function $f(x) = 2x^3 - 6x^2 - 20x$, determine the x- and y-intercepts.

Homework: *You should now be ready to attempt problems 4-7 in "Homework – Section 5.2" on WeBWorK.*