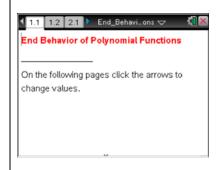
End Behavior of Polynomial Functions Student Activity

Name _____ Class _____

Open the TI-Nspire document *End_Behavior_of_Polynomial_ Functions.tns*.

In this activity, you will examine several power and polynomial functions to determine their similarities and differences and the characteristics of their end behavior.



Move to page 1.2.

Press ctrl ▶ and ctrl ◀ to navigate through the lesson.

- 1. Click the slider arrows on the left side of the screen to see the graphs of various power functions in the form $y = x^a$.
 - a. As you scroll through the functions, describe the similarities and differences that you see.
 - b. As you look at the various graphs of the power functions, what happens to the value of the function as $x \to \infty$? Give a mathematical explanation to describe the behavior of the graph.
 - c. Again, look at the various graphs, and as $x \to -\infty$, what happens to the *y*-values? Explain this behavior mathematically.

Move to page 2.1.

- 2. Click the slider arrows on the left side of the screen to see the graphs of additional power functions.
 - a. How do these power functions differ from the functions with a positive coefficient on page 1.2?
 - b. As $x \to \infty$, what happens to the *y*-values?
 - c. As $x \to -\infty$, what happens to the *y*-values?

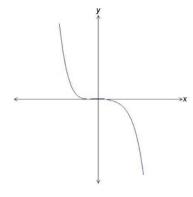


End Behavior of Polynomial Functions Student Activity

3. Write a general statement about the end behavior of power functions.

Move to page 3.1.

- 4. A polynomial function is a sum of power functions whose exponents are non-negative integers. What power function do you expect this polynomial function to resemble? Why?
- 5. Click the slider arrows labeled "zoom" and zoom out.
 - a. As you change the graph's window, what do you predict will happen to the shape of the graph? Was your prediction correct?
 - b. Discuss the similarities and differences between the polynomial function and the power function.
- 6. Click the slider arrows labeled "graph." Zoom out each of the graphs. By looking at the equation of a polynomial function, how do you determine which power function the graph will resemble? Explain your reasoning.
- 7. The graph of a polynomial function is shown.
 - a. Write a possible equation that models the function.



b. Explain your reasoning.