



# Families of Functions

## Student Activity

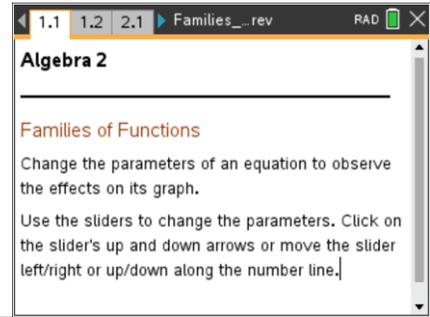


Name \_\_\_\_\_

Class \_\_\_\_\_

Open the TI-Nspire™ document *Families\_of\_Functions.tns*.

What effect does changing the parameters of an equation have on its graph? In this activity, you will explore the effects of changing the parameters one at a time.



Move to page 1.2.

Perform the following actions for each page in the TI-Nspire document, and then fill in the table below.

- Click the slider (up or down arrow) on each page to manipulate the variable **a**. Note what **a** does to the graphs of the functions on each page.
- Grab and drag the slider point **h** on each page to manipulate the variable **h**. Note what **h** does to the graphs of the functions on each page.
- Grab and drag the slider point **k** on each page to manipulate the variable **k**. Note what **k** does to the graphs of the functions on each page.

Page	Parent Function (Equation or Type)	Sketch of Parent Function	Effects of Parameter <i>a</i>	Effects of Parameter <i>h</i>	Effects of Parameter <i>k</i>
1.2					
2.1					
3.1					
4.1					
5.1					
6.1					
7.1					



1. Given any function, describe the effects parameter  $a$  has on its graph when:
  - a.  $|a| > 1$
  - b.  $0 < |a| < 1$
  - c.  $a < 0$
  - d.  $a = 0$
  
2. Given any function, describe the effects parameter  $h$  has on its graph when:
  - a.  $h > 0$
  - b.  $h < 0$
  - c.  $h = 0$
  
3. Given any function, describe the effects parameter  $k$  has on its graph when:
  - a.  $k > 0$
  - b.  $k < 0$
  - c.  $k = 0$
  
4. Given the following functions, describe the transformations on the parent function,  $f(x)$ .
  - a.  $f(x) = x^2$ ;  $h(x) = 3(x - 4)^2 + 2$
  - b.  $f(x) = x^3$ ;  $g(x) = -(x - 1)^3$
  
5. Given the following transformations, write the equation of the function.
  - a. The graph of  $f(x) = \sqrt{x}$  is reflected over the  $x$ -axis, vertically stretched by a factor of 2, and translated vertically down 1 unit.
  - b. The graph of  $f(x) = |x|$  is translated horizontally to the left 3 units and translated vertically up 5 units.