

Name: _____ Date: _____ Period: _____

2.5 Transformations a, h, k

All of the different transformations of a function make of the rest of the family of functions. Take any parent function, $f(x)$, the transformations create new functions which have similar structure as the parent but may be flipped, moved, or dilated.

General Function Notation: $f(x) \rightarrow af(x - h) + k$

a	h	k
Vertical reflection: <i>(over the x-axis)</i> a is negative	Shift left: $x+h$	Shift up: $+k$
Vertical stretch: $a > 1$	Shift right: $x-h$	Shift down: $-k$
Vertical shrink: $0 < a < 1$		

Note: $f(-x)$ is a horizontal reflection over the y-axis:

We can talk about transformations using function notation. Describe the transformations of the function, $f(x)$.

Example 1: $g(x) = f(x - 1) - 3$ shifts right 1 down 3	Example 2: $h(x) = -3f(x) + 2$ reflection over the x-axis vertical stretch by 3 shifts up 2	Example 3: $p(x) = \frac{2}{3}f(x + 6)$ vertical shrink by $\frac{2}{3}$ shift left 6
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We can talk about transformations when giving the equation of a function. State what the parent function for the equation and then describe the transformations of the parent function.

Example 4:

$$y = 3\sqrt{x - 7} + 1$$

Parent function: $y = \sqrt{x}$

Transformation(s):

**shift right 7
up 1
v. stretch by 3**

Example 5:

$$y = -\frac{1}{2}(x + 3)^3$$

Parent function: $y = x^3$

Transformation(s):

Example 6:

$$y = 3(2)^{x+1} - 5$$

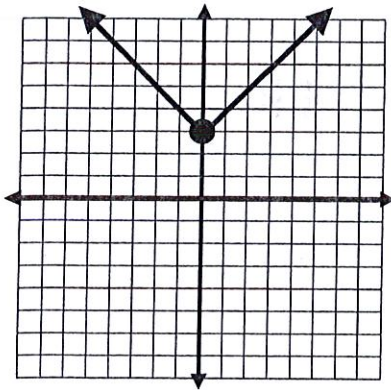
Parent Function:

Transformation(s):

We can talk about transformations when giving a graph of the function if we compare it to its parent function. Describe the transformations from $f(x)$ to $g(x)$. Remember $f(x)$ is the parent function. Attempt to write the equation based on the transformations.

- Graphs are approximately drawn to scale.
- There are no vertical shrinks or stretches from the parent function.
- Focus on the important point/features of each function based on its parent function.

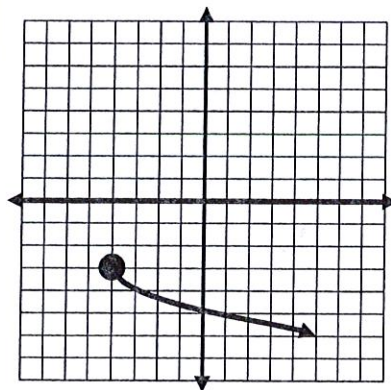
Example 7:



Transformation(s):

Equation: _____

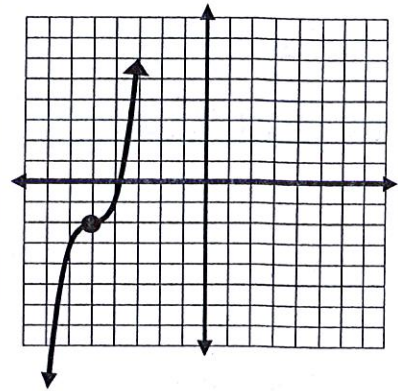
Example 8:



Transformation(s):

Equation: _____

Example 9:



Transformation(s):

Equation: _____