Essential Question: How can we write the equation of a transformed function?

Do Now:

A. Which equation will shift the graph of $y = x^2$ left 5 units and up 6 units?

a. $y = (x + 6)^2 - 5$
b. $y = (x + 5)^2 - 6$
c. $y = (x + 5)^2 + 6$
d. $y = (x - 5)^2 + 6$

B. The equation $y = (x + 3)^2 - 2$ moves the vertex of the parent function $y = x^2$ to:

a. (3, 2)
b. (-3, -2)
c. (-2, 3)
d. (2, -3)

Transformation Rules for Functions

	Equation	How to obtain the graph
TRANSLATION	$y = f(x) + c$	Shift graph $y = f(x)$ _____ c units
	$y = f(x) - c$	Shift graph $y = f(x)$ _____ c units
	$y = f(x - c)$	Shift graph $y = f(x)$ _____ c units
	$y = f(x + c)$	Shift graph $y = f(x)$ _____ c units
REFLECTION	$y = -f(x)$	_____ graph $y = f(x)$ over x-axis
DILATION	$y = af(x)$ $(a > 1)$	_____ graph $y = f(x)$ vertically by factor of a
	$y = af(x)$ $(0 < a < 1)$	_____ graph $y = f(x)$ vertically by factor of a

Give the name of the parent function and describe the transformation represented.

1. $g(x) = x^2 - 1$ Name: _____

   Transformation:_____

2. $f(x) = 2|x-1|$ Name: _____

   Transformation:_____

3. $h(x) = \sqrt{x-2}$ Name: _____

   Transformation:_____

4. $f(x) = |x+5| - 2$ Name: _____

   Transformation:_____

Given the parent function and a description of the transformation, write the equation of the transformed function, f(*x*).

5. Absolute value—vertical shift up 5, horizontal shift right 3. _____

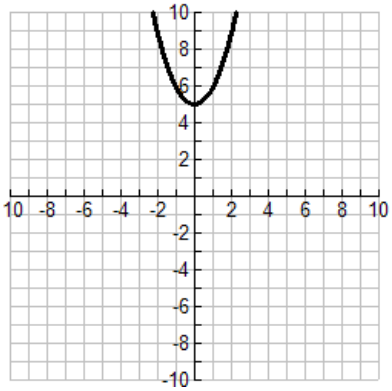
6. Square root — horizontal shift right 2, vertical shift down 1. _____

7. Cubic—reflected over the x axis and vertical shift down 2. _____

8. Quadratic—vertical compression by 0.45, horizontal shift left 8. _____

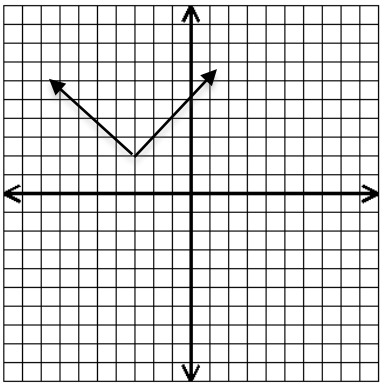
Write the equation of the transformed function.

9.



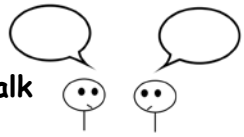
Parent: $y = x^2$

10.



Parent: $y = |x|$

Turn and Talk



1. If a quadratic function, $f(x)$, has a turning point at $(4,-5)$, and $g(x)=f(x-3)+2$, then where does $g(x)$ have a turning point?

   (1) $(1,-3)$ (3) $(1,-7)$

   (2) $(7,-3)$ (4) $(7,-7)$

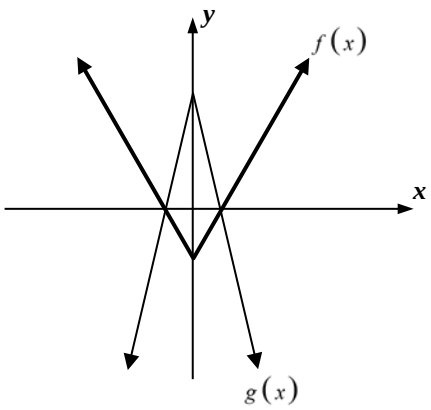
2. The graph of the function $f(x)$ is shown below in bold. Which of the following would give a possible formula for the function $g(x)$?

   (1) $g(x)=3f(x)$

   (2) $g(x)=\frac{1}{2}f(x)$

   (3) $g(x)=-f(x)$

   (4) $g(x)=-2f(x)$



3. Given that $f(x) = x^3 + 1$, find $g(x)$ if $g(x) = 2[f(x)] + 5$.