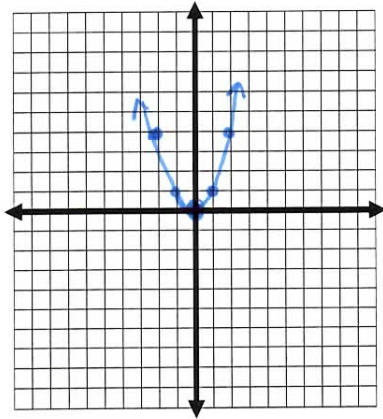


Key

13.1a Notes Transformation of Functions: Up/Down

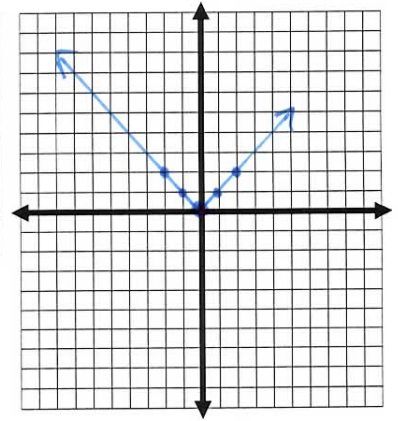
Parent Functions: Quadratic $f(x) = x^2$

x	$f(x) = x^2$
2	$2^2 = 4$
1	$1^2 = 1$
0	$0^2 = 0$
-1	$(-1)^2 = 1$
-2	$(-2)^2 = 4$



Absolute Value $f(x) = |x|$

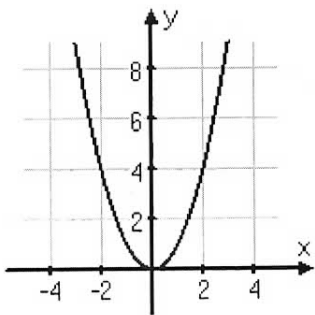
x	$f(x) = x $
2	$ 2 = 2$
1	$ 1 = 1$
0	$ 0 = 0$
-1	$ -1 = 1$
-2	$ -2 = 2$



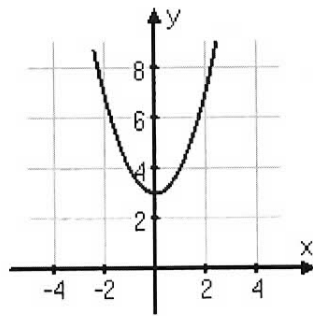
Upward or Downward Shift: $f(x) + a$ translates $f(x)$ vertically

If the original (parent) function is $y = f(x)$, the translation (sliding) of the function vertically upward or downward is the function $f(x) + a$.

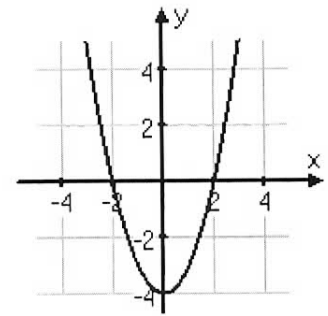
Ex 1: Given the graph on the left, $f(x) = x^2$, describe what happens to the graphs on the right and write a function $g(x)$ and $h(x)$.



$f(x) = x^2$

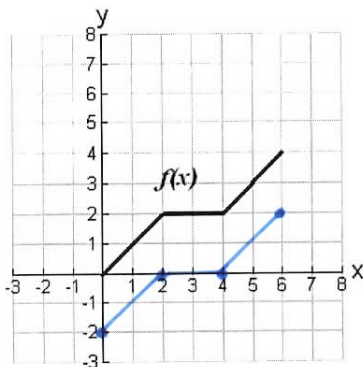


$g(x) = x^2 + 3$

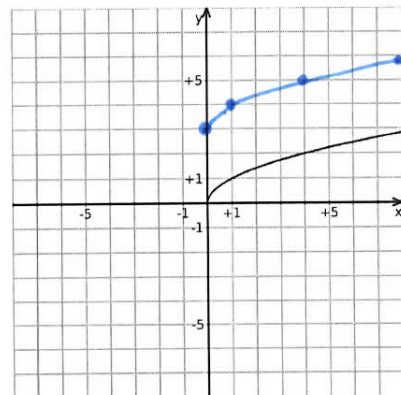


$h(x) = x^2 - 4$

Ex 2: Given the graph of $f(x)$ below, sketch a graph for $f(x) - 2$ on the same grid.



Ex 3: Given the parent graph $f(x) = \sqrt{x}$, sketch a graph for $k(x) = \sqrt{x} + 3$



13.1b Notes Transformation of Functions: Left/Right

Slide to the right or left: $f(x + a)$ translates $f(x)$ horizontally

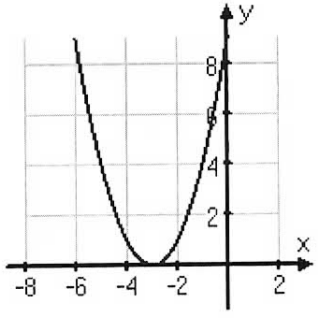
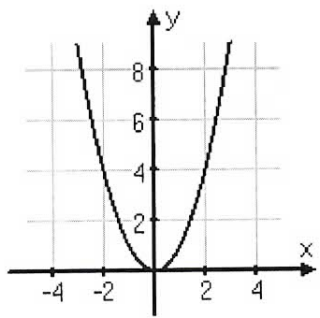
If the original (parent) function is $y = f(x)$, the translation (sliding) of the function horizontally to the left or right is given by the function $f(x - a)$.

****Remember that you are "subtracting" the value of a from x . Thus $y = f(x + 2)$ is really $f(x - (-2))$ and the graph moves to the left.****

$y = f(x + a)$ shifts LEFT

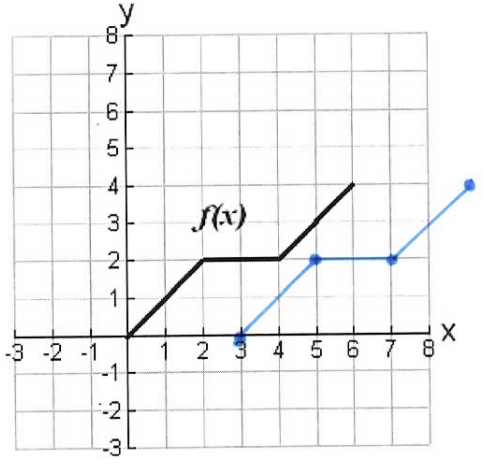
$y = f(x - a)$ shifts RIGHT

Ex 5: Given the graph on the left, $y = x^2$, describe what happens to the graph on the right and write a function $t(x)$ for it.



$f(x) = (x + 3)^2$

Ex 6: Given the graph of $f(x)$ below, sketch a graph for $f(x - 3)$ on the same grid.



Ex 7: Given the parent graph of $f(x) = |x|$, sketch a graph for $p(x) = |x + 2|$.

