

# Transformation

## Rule

more to the left

$a > 1$  gets narrower

more up

$$f(x) = a \left( x \pm h \right)^2 \pm k$$

more to the right

more down

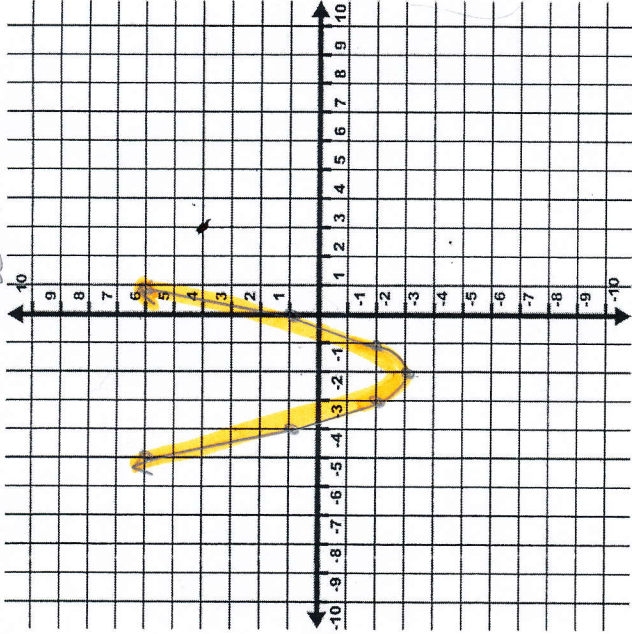
$a < 1$  gets wider

$a$  is negative  $\rightarrow$  turns upside down

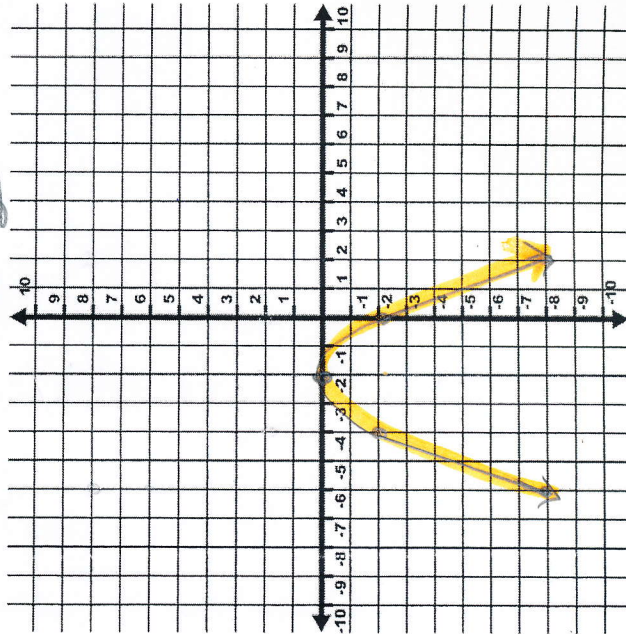


In the following functions, the transformations have been combined on the quadratic function that you just discovered. Graph the following functions with at least 3 precise points.

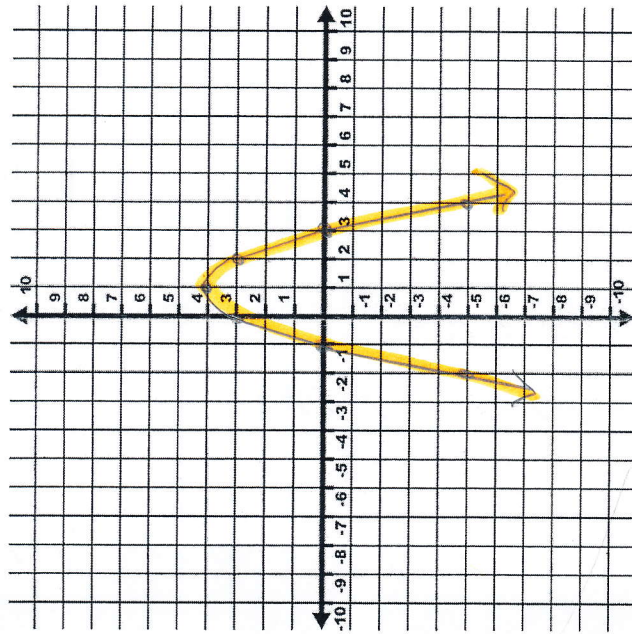
1.)  $f(x) = (x + 2)^2 - 3$  vertex  $(-2, -3)$   
 $a = 1$



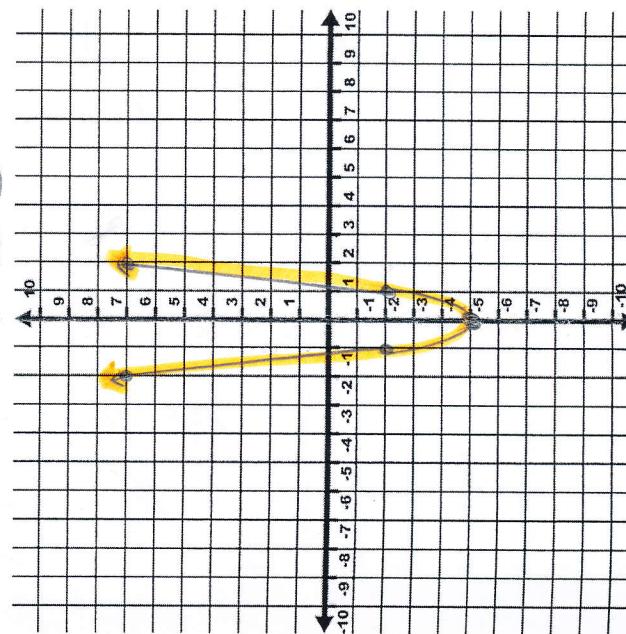
4.)  $f(x) = -\frac{1}{2}(x + 2)^2$  vertex  $(-2, 0)$   
 $a = -\frac{1}{2}$



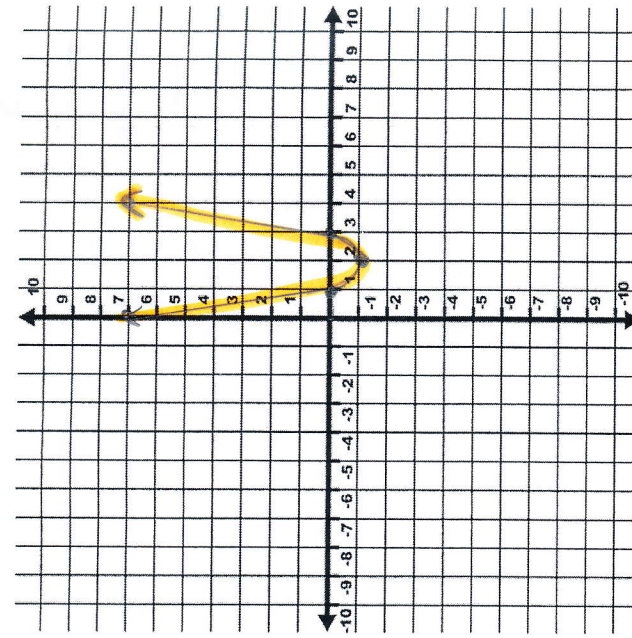
2.)  $f(x) = -(x - 1)^2 + 4$  vertex  $(1, 4)$   
 $a = -1$



5.)  $f(x) = 3x^2 - 5$  vertex  $(0, -5)$   
 $a = 3$



3.)  $f(x) = 2(x - 2)^2 - 1$  vertex  $(2, -1)$   
 $a = 2$



6.)  $f(x) = -(x + 3)^2 + 4$  vertex  $(-3, 4)$   
 $a = -1$

