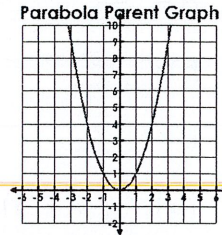


Name: Key Date: \_\_\_\_\_

## Transformations of Vertex Form

$$f(x) = a(x-h)^2 + k$$

Vertex: (h, k)



### What does a do?

- reflect across the x-axis (-a)
- vertical stretch ( $a > 1$ )
- vertical shrink ( $0 < a < 1$ )

### What does h do?

- ★ • moves left (+h)
- ★ • moves right (-h)

### What does k do?

- moves up (+k)
- moves down (-k)

*1-3-5 rule*

Determine what transformations are applied in the following functions.

1.  $f(x) = (x-3)^2 + 5$

*Right 3  
Up 5*

2.  $f(x) = -(x-2)^2 + 7$

*Reflect over x-axis  
Right 2  
Up 7*

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

*V. Shrink of 1/3  
Left 3  
Down 2*

4.  $f(x) = 4(x-3)^2 + 8$

*V. Stretch of 4  
Right 3  
Up 8*

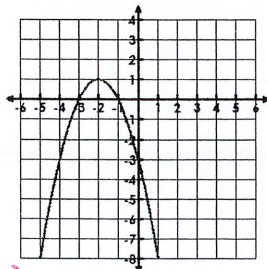
Vertex: (h,k)

Axis of Symmetry:  $x = h$

Given the graph of the quadratic, find a, h, & k. Then write the equation in vertex form.

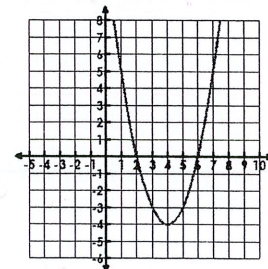
5.

- $a = \underline{-1}$
- $h = \underline{-2}$
- $k = \underline{1}$
- $f(x) = \underline{-(x+2)^2 + 1}$



6.

- $a = \underline{1}$
- $h = \underline{4}$
- $k = \underline{-4}$
- $f(x) = \underline{(x-4)^2 - 4}$



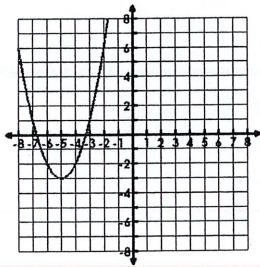
7.

•  $a = \underline{1}$

•  $h = \underline{-5}$

•  $k = \underline{-3}$

•  $f(x) = (x+5)^2 - 3$



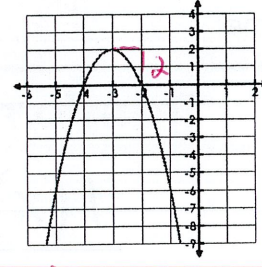
8.

•  $a = \underline{-2}$

•  $h = \underline{-3}$

•  $k = \underline{2}$

•  $f(x) = -2(x+3)^2 + 2$



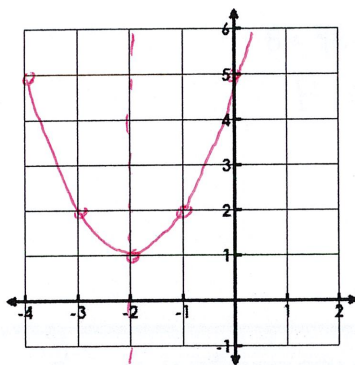
### Steps to Graphing in VERTEX form:

- Find the vertex. Plot it.
- Find the axis of symmetry. Graph this lightly as a dashed vertical line.
- On your calculator: TABLE, EDIT FUCTION, ENTER, START = <enter your h-value>, CALC, ENTER. Scroll up and down to get other ordered pairs. *or 1-3-5 rule*
- Connect in a u-shape with arrows at each end.

### Graph & identify the vertex and axis of symmetry.

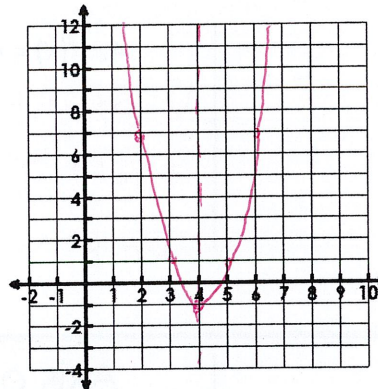
9.  $f(x) = (x+2)^2 + 1$

$(-2, 1)$



10.  $f(x) = 2(x-4)^2 - 1$

$(4, -1)$



11.  $f(x) = -(x-1)^2 + 2$

$(1, 2)$

