

**Homework: Vertex Form of a Quadratic Equation****Directions:** Describe how each function compares to the parent function. Then, state the vertex.

1.)  $f(x) = (x + 4)^2$

vertex:  $(-4, 0)$  left 4

2.)  $f(x) = x^2 + 8$

vertex:  $(0, 8)$  up 8

3.)  $-x^2 - 5$

vertex  $(0, -5)$  reflect  
down 5

4.)  $f(x) = (x - 6)^2 + 2$

vertex:  $(6, 2)$  right 6  
up 2

5.)  $f(x) = \frac{2}{3}(x + 3)^2 + 4$

vertex:  $(-3, 4)$  shrink by  $\frac{2}{3}$   
left 3  
up 4

6.)  $f(x) = -2(x - 1)^2 - 1$

vertex:  $(1, -1)$  reflect  
stretch by 2  
right 1 down 1

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

vertex:  $(2, 0)$  right 2  
reflect stretch by  $\frac{3}{2}$ 

8.)  $f(x) = 4x^2 - 7$

vertex:  $(0, -7)$  stretch by 4  
down 7**Directions:** Given the transformations described, write the quadratic function in vertex form.9.) Kyle graphed the parent function of a quadratic equation. Then, he shrunk the graph by a factor of  $\frac{1}{2}$ , and translated it four units down and two units to the right. What is the equation of the new parabola?

$$f(x) = \frac{1}{2}(x + 2)^2 - 4$$

10.) Mercedes graphed the parent function of a quadratic equation with a vertex at  $(-1, 7)$ , then she added a stretch factor of three. What is the equation of the new parabola?

$$f(x) = 3(x + 1)^2 + 7$$

11.) Joshua graphed a quadratic function that opens down and has a maximum point at  $(2, 6)$ . What is the equation of the function he graphed?

$$f(x) = -(x - 2)^2 + 6$$

**Directions:** Find the vertex and y-intercept of the graph. Then plot the points to graph the equation.

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

vertex:  $(-3, -5)$ 

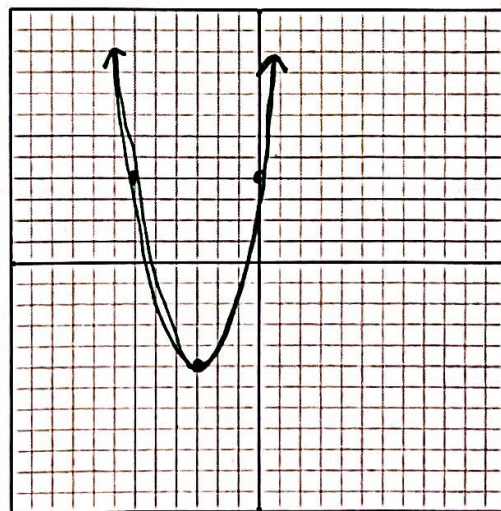
$$f(0) = (0 + 3)^2 - 5$$

$$= (3)^2 - 5$$

$$= 9 - 5$$

$$= 4$$

$$\therefore (0, 4) \rightarrow \text{y-intercept}$$





13.)  $f(x) = (x - 1)^2 + 6$

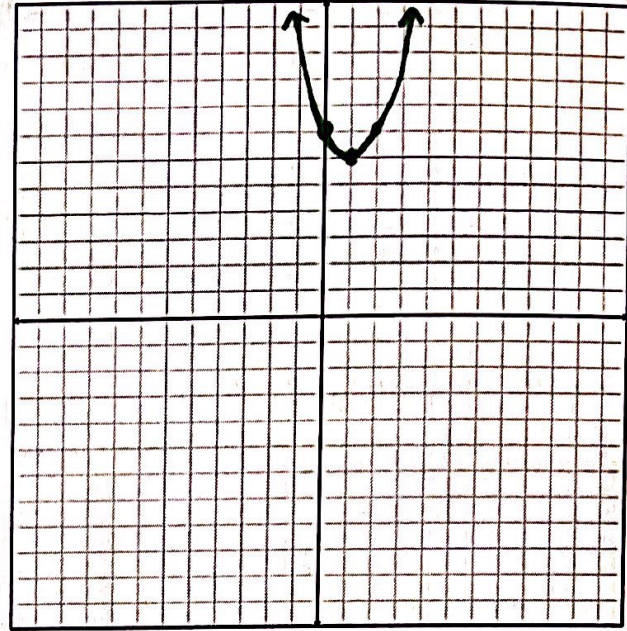
vertex:  $(1, 6)$ 

$$f(0) = (0 - 1)^2 + 6$$

$$= (-1)^2 + 6$$

$$= 1 + 6$$

$$= 7 \rightarrow 7 \text{ is the } y\text{-intercept}$$



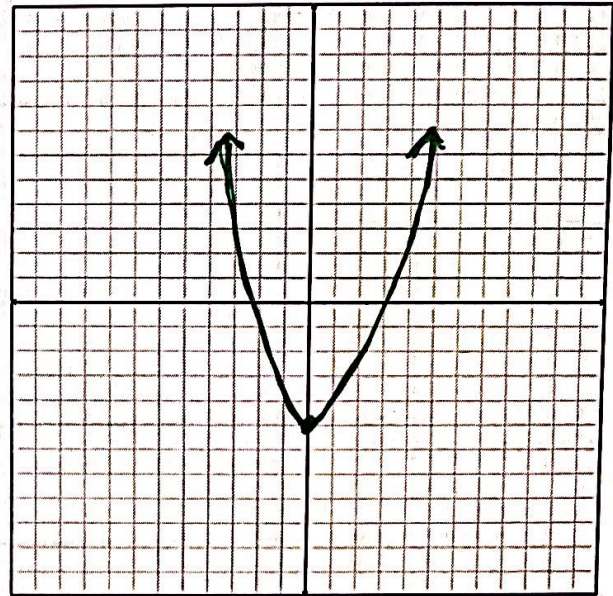
14.)  $f(x) = 2x^2 - 5$

vertex:  $(0, -5)$ 

$$f(0) = 2(0)^2 - 5$$

$$= 0 - 5$$

$$= -5 \rightarrow y\text{-intercept}$$



15.)  $f(x) = -(x + 4)^2 + 7$

vertex:  $(-4, 7)$ 

$$f(0) = -(0 + 4)^2 + 7$$

$$= -(4)^2 + 7$$

$$= -16 + 7$$

$$= -9 \rightarrow y\text{-intercept}$$

