

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

### Vertex Form of a Quadratic

UNIT QUESTION: How are real life scenarios represented by quadratic functions?

Today's Question: How do we graph quadratics in vertex form using transformations?  
MCC9-12.F.BF.3

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

There is a negative in front, reflects over x-axis

$a > 1$ , stretch  
 $0 < a < 1$ , shrink

Right (-)/Left (+)  
Up (+)/Down (-)

Describe the transformations of the parent graph for each equation.

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

Up 5

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

Reflect over x-axis  
Left 9  
Down 2

3.  $f(x) = \frac{1}{2}(x-10)^2$

shrink of  $\frac{1}{2}$   
Right 10

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

Up 2  
Reflect over x-axis  
Stretch of 5

5.  $f(x) = \frac{2}{3}(x-8)^2$

shrink of  $\frac{2}{3}$   
Right 8

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

Left 1  
Up 4

Write the equation in vertex form of the quadratic equation that has been...

7. shifted to the right 4 and up 3  $y = (x-4)^2 + 3$

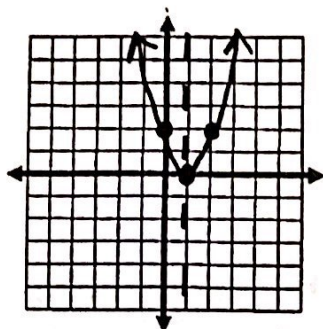
8. reflected over the x-axis and shifted left 11  $y = -(x+11)^2$

9. moved down 17  $y = x^2 - 17$

10. reflected over the x-axis, shifted left 9 and down 8  $y = -(x+9)^2 - 8$

Directions: Graph! Then find each characteristic.

11)  $y = 2(x - 1)^2 + 0$



$a = \frac{2}{1}$

x Domain:  $(-\infty, \infty)$

y Range:  $[0, \infty)$

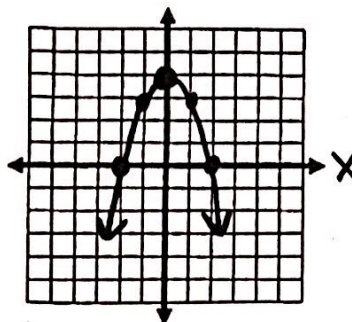
Vertex:  $(1, 0)$

AOS:  $X = 1$

(x-int) Zeros:  $(1, 0)$

y-intercept:  $(0, 2)$

12)  $f(x) = -x^2 + 4$



Domain:  $(-\infty, \infty)$

Range:  $(-\infty, 4]$

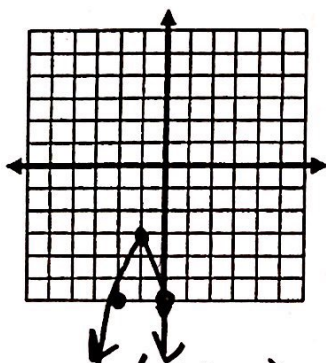
Vertex:  $(0, 4)$

AOS:  $X = 0$

Zeros:  $(-2, 0)$   $(2, 0)$

y-intercept:  $(0, 4)$

13)  $y = -3(x + 1)^2 - 3$



Domain:  $(-\infty, \infty)$

Range:  $(-\infty, -3]$

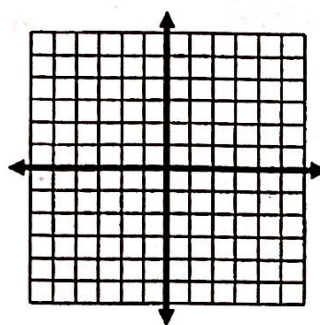
Vertex:  $(-1, -3)$

AOS:  $X = -1$

y-intercept:  $(0, -6)$

zeros: NONE

14)  $y = (x - 3)^2$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertex: \_\_\_\_\_

AOS: \_\_\_\_\_

y-intercept: \_\_\_\_\_