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

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

Vertex: (h,k)

Describe the transformations of the parent graph for each equation.

1. $f(x) = x^2 + 5$
   - a: —
   - h: —
   - k: up 5

2. $f(x) = -(x+9)^2 - 2$
   - a: reflect x-axis
   - h: left 9
   - k: down 2

3. $f(x) = \frac{1}{2}(x-10)^2$
   - a: shrink by ½
   - h: right 10
   - k: —

4. $f(x) = -5x^2 + 2$
   - a: reflect x-axis
   - a: stretch by 5
   - k: up 2

5. $f(x) = \frac{2}{3}(x-8)^2$
   - a: shrink by ⅔
   - h: right 8
   - k: —

6. $f(x) = (x+1)^2 + 4$
   - a: —
   - h: left 1
   - k: up 4

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

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

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

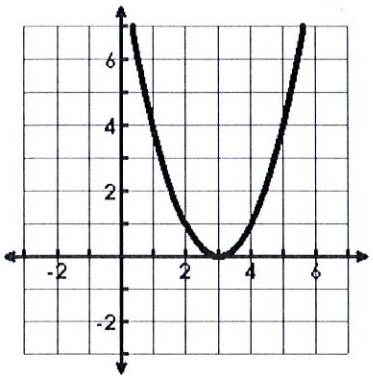
$y = x^2 - 17$ 9. moved down (k) 17

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

Describe the transformations and write an equation for each quadratic function.

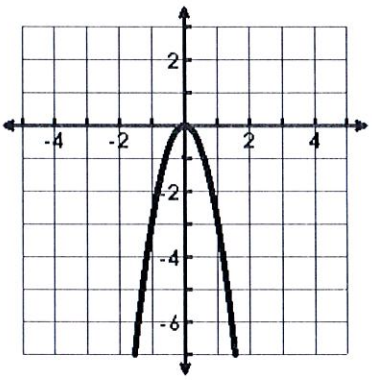
11. Vertex: (3,0)
- a: —
- h: right 3
- k: —

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



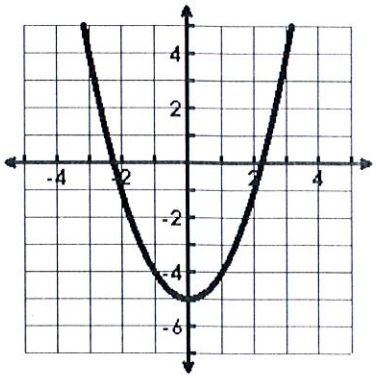
12. Vertex: (0,0)
- a: stretch by 3
- a: reflect x-axis
- h+k: —

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



13. Vertex: (0,-5)
- a: —
- h: —
- k: down 5

f(x) = x^2-5

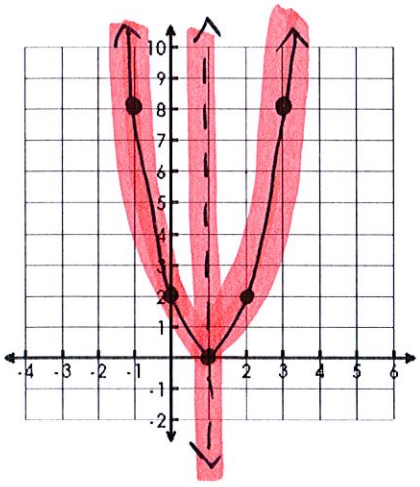


Graph the following equations Identify the vertex and the axis of symmetry.

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

Vertex: (1,0)

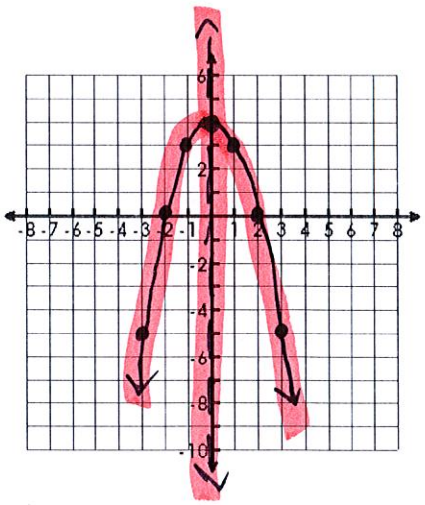
Axis of Symmetry: x = 1



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

Vertex: (0,4)

Axis of Symmetry: x = 0



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

Vertex: (-1,-3)

Axis of Symmetry: x = -1