Honors Math 2
After Unit 3 Test

Name Key

1. Write the vertex form of a quadratic equation.

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

2. What does changing the "a" variable do to the graph of a quadratic?

vertical stretch/shrink

3. Being specific, name 3 ways that a parabola changes with different types of "a" values.

$a > 1$ vertical stretch a (+) opens up

$a < 1$ vertical shrink a (-) opens down

4. What does changing the "h" variable do to the graph of a quadratic?

horizontal translation (Left/right)

5. If "h" is positive how does the parabola move? If negative?

h(+) right h(-) left

6. What does changing the "k" variable do to the graph of a quadratic?

Vertical translation (up/down)

7. If "k" is positive how does the parabola move? If negative?

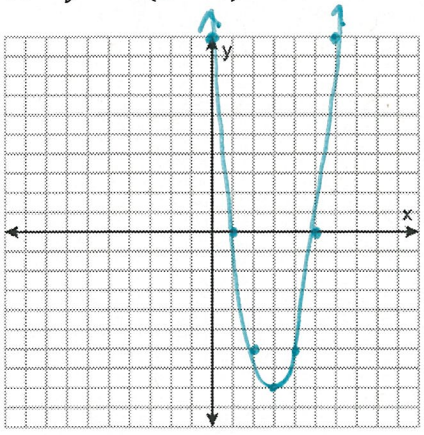
K(+) up K(-) down

8. What conclusion can you make about the variables of h and k together?

(h, K) vertex

Graph the given quadratic function.

9. $y = 2(x-3)^2 - 8$

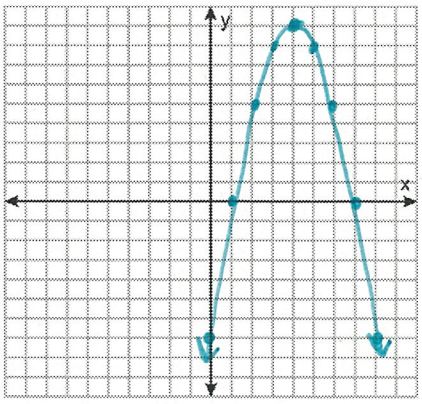


Vertex: (3, -8)

x-intercept(s): (1,0) (5,0)

y-intercept: (0,10)

10. $y = -(x-4)^2 + 9$



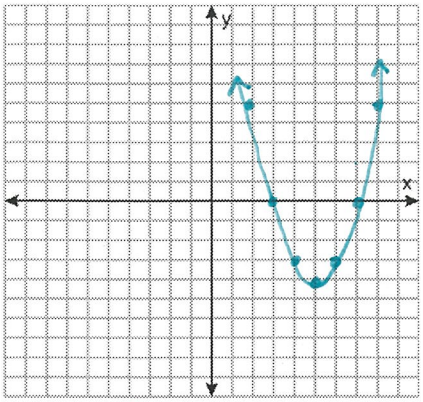
Vertex: (4,9)

x-intercept(s): (1,0) (7,0)

y-intercept: (0,-7)

Graph the given quadratic function.

11. $y = x^2 - 10x + 21$



$x = \frac{10}{2(1)} = 5$

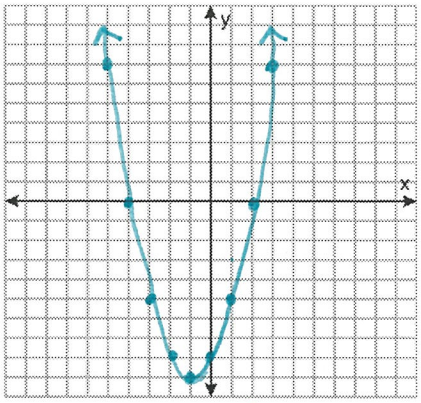
Vertex: (5, -4)

x-intercepts: (3, 0) (7, 0)

Factor: $x^2 - 10x + 21$

$(x-3)(x-7)$

12. $y = x^2 + 2x - 8$



$x = \frac{-2}{2(1)} = -1$

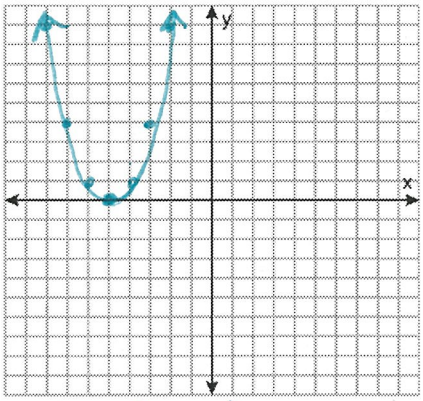
Vertex: (-1, -9)

x-intercepts: (-4, 0) (2, 0)

Factor: $x^2 + 2x - 8$

$(x+4)(x-2)$

13. $y = x^2 + 10x + 25$



$x = \frac{-10}{2(1)} = -5$

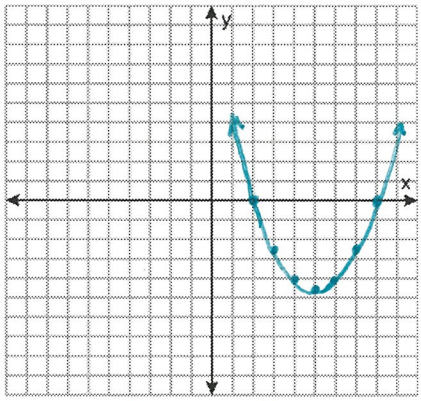
Vertex: (-5, 0)

x-intercepts: (-5, 0)

Factor: $x^2 + 10x + 25$

$(x+5)(x+5) = (x+5)^2$

14. $y = \frac{1}{2}x^2 - 5x + 8$



$x = \frac{5}{2(1/2)} = 5$

Vertex: (5, -4.5)

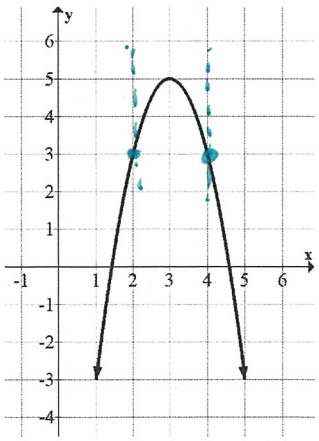
x-intercepts: (2, 0) (8, 0)

Factor: $\frac{1}{2}x^2 - 5x + 8$

$(\frac{1}{2}x - 1)(x - 8)$

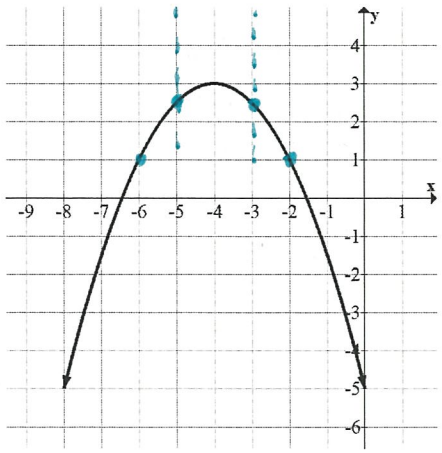
Write the equation, in vertex form, for each graph.

15.



$y = -2(x-3)^2 + 5$

16.



$y = -\frac{1}{2}(x+4)^2 + 3$

17 A potato is shot from a potato gun and its height (feet) is a function of time (seconds) given by the function: $h(t) = -16t^2 + 64t + 50$

t (seconds)	$h(t)$ (height)
0	50
1	98
2	114
3	98
4	50
5	-30

a) Fill in this chart so that it shows the vertex and write the function in vertex form.

$h(t) = -16(t-2)^2 + 114$

b) How long is the potato in the air?

guess about 4.7 from chart

$0 = -16(t-2)^2 + 114$

$7.125 = (t-2)^2$

$t = 2 \pm \sqrt{7.125} \approx 4.66$ sec

c) What is the maximum height reached by the potato?

114 feet (vertex)

d) When will the potato be 20 feet in the air?

guess about 4.3 from chart

$20 = -16(t-2)^2 + 114$

$5.875 = (t-2)^2$

$t = 2 \pm \sqrt{5.875}$

$t \approx 4.42$

e) After 3.5 seconds, how high is the potato?

$h(3.5) = -16(3.5-2)^2 + 114$

$h(3.5) = 78$

makes sense according to table