

Name: Key

Date:

Period:

### Practice Worksheet: Graphing Quadratic Functions in Standard Form

y-axis/  
(zero)

- 1] For any quadratic of the form  $y = ax^2 + c$ , the axis of symmetry is always the line  $x = -b/2a$ .
- 2] If the axis of symmetry of a quadratic is  $x = 2$  and  $(-1, 3)$  is on the graph, then the point  $(5, 3)$  must also be on the graph.
- 3] For any quadratic of the form  $y = ax^2 + c$ , the y-intercept is always the same point as the  $(0, c)$ .
- 4] The graph of  $y = 2x^2 + 4x + 3$  passes through the point  $(1, 9)$  and  $(-1, 1)$ .

only c is left when x is zero

For #5-12, label the axis of symmetry, vertex, y-intercept, and at least three more points on the graph.

5]  $y = x^2 - 4x + 8$   
 $a = 1$   $b = -4$   $c = 8$   
 Opens up or down? up  
 Is vertex a max or min? min  
 y-intercept:  $(0, 8)$   
 Axis of Symmetry is  $x = \frac{-b}{2a} = 2$

Vertex:  $(2, 4)$   $2^2 - 8 + 8$

Solution: NO SOLUTION

6]  $y = 2x^2 + 8x$   
 $a = 2$   $b = 8$   $c = 0$   
 Opens up or down? up  
 Is vertex a max or min? min  
 y-intercept:  $(0, 0)$   
 Axis of Symmetry is  $x = \frac{-b}{2a} = -\frac{8}{4} = -2$

Vertex:  $(-2, -8)$   $2(-2)^2 + 8(-2)$

Solution:  $(-4, 0)$ ;  $(0, 0)$

7]  $y = -3x^2 - 12x + 1$   
 $a = -3$   $b = -12$   $c = 1$   
 Opens up or down? down  
 Is vertex a max or min? max  
 y-intercept:  $(0, 1)$   
 Axis of Symmetry is  $x = \frac{-b}{2a} = -2$

Vertex:  $(-2, 13)$   $-3(-2)^2 - 12(-2) + 1$

Solution:  $\approx (-4.08, 0)$  and  $(1.08, 0)$

8]  $y = -\frac{3}{2}x^2 + 3$   
 $a = -\frac{3}{2}$   $b = 0$   $c = 3$   
 Opens up or down? down  
 Is vertex a max or min? max  
 y-intercept:  $(0, 3)$   
 Axis of Symmetry is  $x = 0$

Vertex:  $(0, 3)$

Solution:  $\approx (-1.4, 0)$ ;  $(1.4, 0)$

Find the coordinates  $(2, -3)$  and  $(-2, -3)$  to guide the shape of the parabola.

9]  $y = 2x^2 - 1$   
 $a = 2$   $b = 0$   $c = -1$   
 Opens up or down? up  
 Is vertex a max or min? min  
 y-intercept:  $(0, -1)$   
 Axis of Symmetry is  $x = 0$

Vertex:  $(0, -1)$

Solution:  $\approx (-0.71, 0)$ ;  $(0.71, 0)$

Find the coordinates  $(2, 7)$  and  $(-2, 7)$  to guide the shape of the parabola.

10]  $y = 2x^2 + 4x + 3$

$a = 2$   $b = 4$   $c = 3$

Opens up or down? *up*

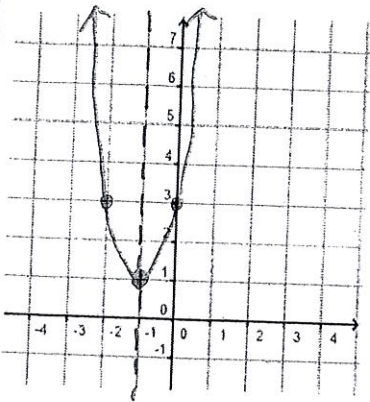
Is vertex a max or min? *min*

y-intercept:  $(0, 3)$

Axis of Symmetry is  $x = \frac{-4}{4} = -1$

*NO SOLUTION*

Vertex:  $(-1, 1)$   $2(1) + 4(-1) + 3$   
 $2 - 4 + 3$



Read your graph to find the coordinates of the points:

$(1, 9)$ ,  $(3, 33)$ , and

$(4, 51)$   $32 + 16 + 3$

11]  $y = \frac{1}{3}x^2 + 2x - 1$

$a = \frac{1}{3}$   $b = 2$   $c = -1$

Opens up or down? *up*

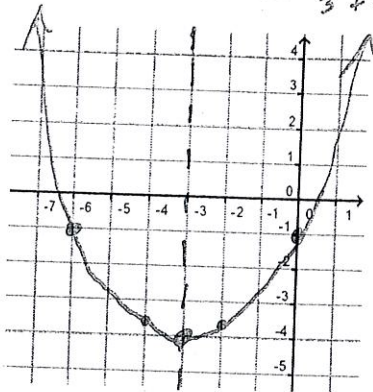
Is vertex a max or min? *min*

y-intercept:  $(0, -1)$

Axis of Symmetry is  $x = \frac{-2}{\frac{2}{3}} = \frac{-6}{2} = -3$

Solution:  $\approx (-6.5, 0)$  &  $(.46, 0)$

Vertex:  $(-3, -4)$   $\frac{1}{3}(-3)^2 + 2(-3) - 1$   
 $3 - 6 - 1$



Read your graph to find the coordinates of the points:

$(-6, -1)$ ,  $(-4, -11/3)$ ,  $16/3 + -8 - 1$   
 $5 1/3 - 9$

and  $(-2, -11/3)$   $4/3 - 4 - 1$   
 $1 2/3 - 5$

12]  $y = -\frac{1}{2}x^2 - 2x - 2$

$a = -\frac{1}{2}$   $b = -2$   $c = -2$

Opens up or down? *down*

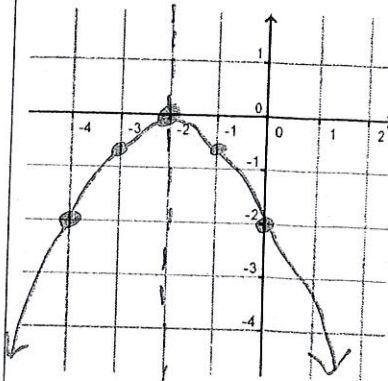
Is vertex a max or min? *max*

y-intercept:  $(0, -2)$

Axis of Symmetry is  $x = \frac{-2}{-1} = 2$

Solution:  $(-2, 0)$

Vertex:  $(-2, 0)$   $-2 + 4 - 2$   
 $0$



Read your graph to find the coordinates of the points:

$(-4, -2)$ ,  $(-3, -1/2)$ ,  $-1/2 + 2 - 2$

and  $(-1, -1/2)$ .

13] A baker has modeled the monthly operating costs for making wedding cakes by the function

$y = \frac{1}{2}x^2 - 12x + 150$  where  $y$  is the total cost in dollars and  $x$  is the number of cakes prepared.

A] What is the minimum operating cost?

~~if the baker makes no cakes, then it will cost at least \$150 (y-intercept)~~ <sup>still</sup> ~~then it will cost at least~~ **\$78**

~~\$150 (y-intercept)~~

vertex:  $(12, 78)$

B] How many cakes should be prepared to yield the minimum operating cost?

$150 = \frac{1}{2}x^2 - 12x + 150 \rightarrow 0 = x(x - 24)$

$0 = \frac{1}{2}x^2 - 12x$

$0 = x^2 - 24x$

~~0 = x~~ or  $0 = x - 24$

$24 = x$

~~24 cakes~~ **12**

14] The path that a motocross dirt bike rider follows during a jump is given by  $y = -0.4x^2 + 4x + 10$  where  $x$  is the horizontal distance (in feet) from the edge of the ramp and  $y$  is the height (in feet). What is the maximum height of the rider during the jump?

graph it then calculate maximum

$(5, 20)$  so max. height is 20 feet.

$(t, h)$