Key

Name: Date: Period:

Practice Worksheet: Graphing Quadratic Functions in Standard Form

1] For any quadratic of the form $y = ax^2 + c$, the axis of symmetry is always the line $x = 0$.

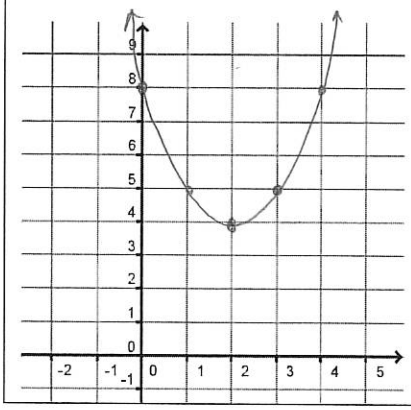
2] If the axis of symmetry of a quadratic is $x = 2$ and $(-1, 3)$ is on the graph, then the point (5, 3) must also be on the graph.

3] For any quadratic of the form $y = ax^2 + c$, the y-intercept is always the same point as the vertex.

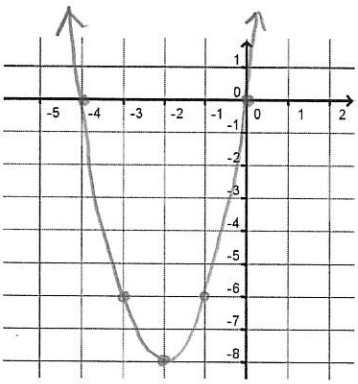
4] The graph of $y = 2x^2 + 4x + 3$ passes through the point (1, 9) and (-1, 1).

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

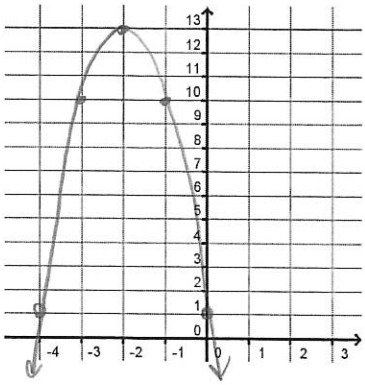
5] $y = x^2 - 4x + 8$
a = 1 b = -4 c = 8
Opens up or down? up
Is vertex a max or min? min
y-intercept: (0, 8)
Axis of Symmetry is x= 2
$x = \frac{+4}{2(1)} = 2$
Vertex: (2, 4)



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= -2
$x = \frac{-8}{2(2)} = \frac{-8}{4} = -2$
Vertex: (-2, -8)

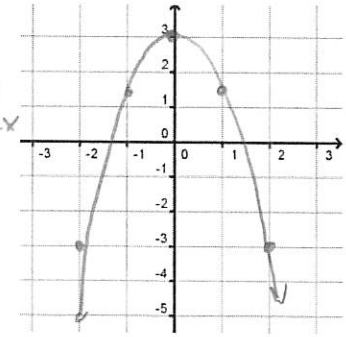


7] $y = -3x^2 - 12x + 1$
a = -3 b = -12 c = C
Opens up or down? Down
Is vertex a max or min? Max
y-intercept: (0, 1)
Axis of Symmetry is x= -2
$x = \frac{12}{2(-3)} = -2$
Vertex: (-2, 13)



1(3)
3(3)
5(3)

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)

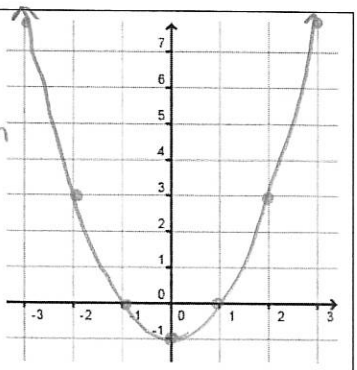


1 (-3/2)
3 (-3/2)
5 (-3/2)
7 (-3/2)

-1.5
-4.5
-7.5

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)



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

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

a = 2 b = 4 c = 3

Opens up or down? up

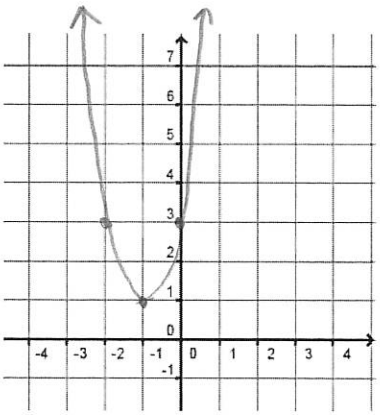
Is vertex a max or min? Min

y-intercept: (0,3)

Axis of Symmetry is x= -1

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

Vertex: (-1 , 1)



Read your graph to find the coordinates of the points:

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

(4, 51).

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

a = 1/3 b = 2 c = -1

Opens up or down? up

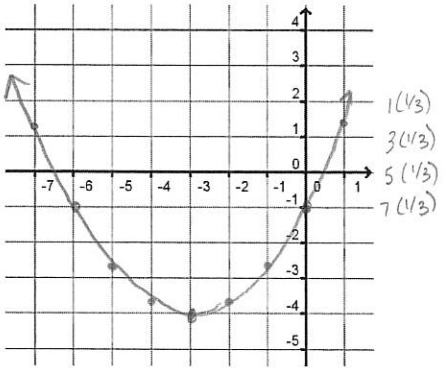
Is vertex a max or min? MIN

y-intercept: (0,-1)

Axis of Symmetry is x= -3

$x = \frac{-2}{2(1/3)} =$

Vertex: (-3 , -4)



Read your graph to find the coordinates of the points:

(-6, -1), (-4, -11/3),

and (-2, -11/3).

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

a = -1/2 b = -2 c = -2

Opens up or down? Down

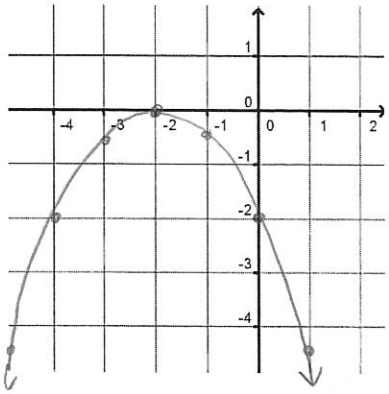
Is vertex a max or min? Max

y-intercept: (0,-2)

Axis of Symmetry is x= -2

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

Vertex: (-2 , 0)



$1(-1/2) = -\frac{1}{2}$
$3(-1/2) = -1.5$
$5(-1/2) = -2.5$
$7(-1/2) = -3.5$

Read your graph to find the coordinates of the points:

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

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? Find vertex

$x = \frac{12}{2(1/2)} = 12$ V: (12, 78) $78 min cost

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

12 cakes

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?

$x = \frac{-4}{2(-.4)} = 5$ V: (5, 20)

20 ft

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Practice Worksheet: Graphing Quadratic Functions in Intercept Form

For #1-6, label the x-intercepts, axis of symmetry, vertex, y-int., and at least one more point on the graph.

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

a = 1/2 p = -4 q = 2

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

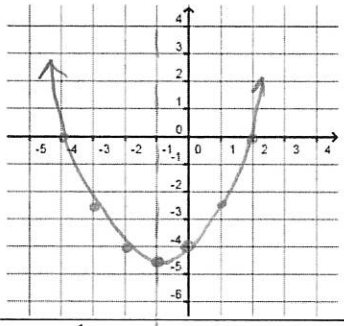
Axis of Symmetry is x= -1

Vertex: (-1 , -4.5)

Opens up or down? up

Slope to pt one unit from vertex:

y-intercept: (0, -4)



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

a = -1/2 p = 0 q = 8

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

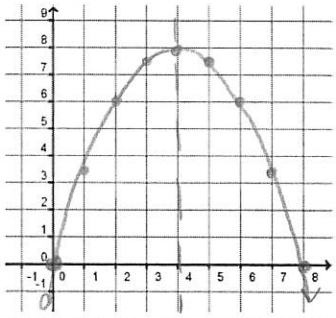
Axis of Symmetry is x= 4

Vertex: (4 , 8)

Opens up or down? Down

Slope to pt one unit from vertex:

y-intercept: (0, 0)



3] $y = (x+2)(x-2)$

a = 1 p = -2 q = 2

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

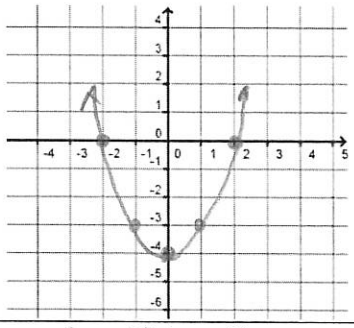
Axis of Symmetry is x= 0

Vertex: (0 , -4)

Opens up or down? up

Slope to pt one unit from vertex:

y-intercept: (0, -4)



4] $y = -\frac{1}{3}(x+1)(x-5)$

a = -1/3 p = -1 q = 5

x-intercepts: (-1 , 0) (5 , 0)

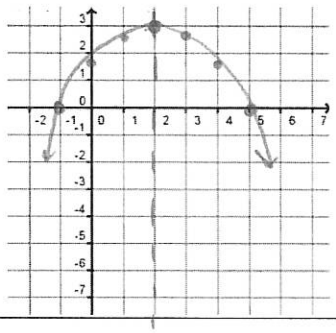
Axis of Symmetry is x= 2

Vertex: (2 , 3)

Opens up or down? Down

Slope to pt one unit from vertex:

y-intercept: (0, 5/3)



5] $y = 4(x+2)(x+1)$

a = 4 p = -2 q = -1

x-intercepts: (-2 , 0) (-1 , 0)

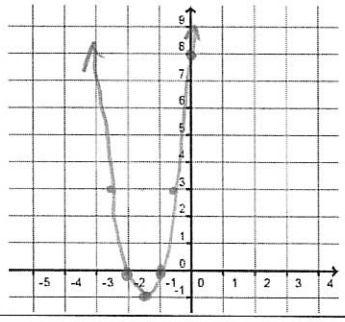
Axis of Symmetry is x=_____

Vertex: (-1.5, -1)

Opens up or down? up

Slope to pt one unit from vertex:

y-intercept: (0, 8)



6] $y = -(x-3)(x-3)$

a = -1 p = 3 q = 3

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

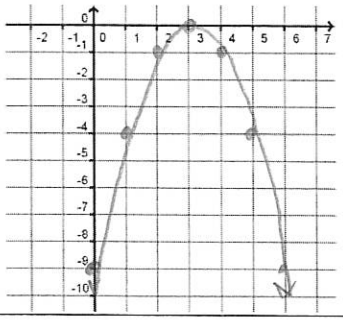
Axis of Symmetry is x= 3

Vertex: (3 , 0)

Opens up or down? Down

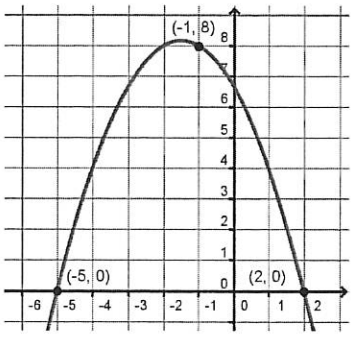
Slope to pt one unit from vertex:

y-intercept: (0, -9)



Write the equation of the parabola in intercept form.

7]



p = -5 q = 2 x = -1 y = 8

Find a. $y = a(x+5)(x-2)$

$8 = a(-1+5)(-1-2)$

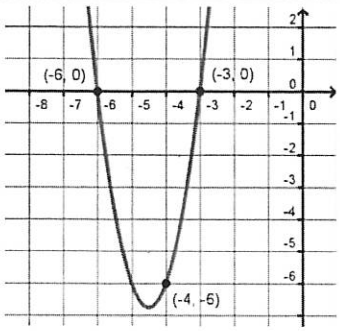
$8 = a(4)(-3)$

$a = -2/3$

Write the equation.

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

8]



p = -6 q = -3 x = -4 y = -6

Find a. $y = a(x+6)(x+3)$

$-6 = a(-4+6)(-4+3)$

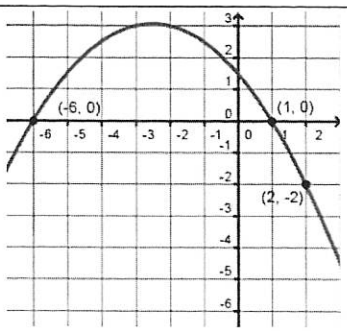
$-6 = a(-2)$

$a = 3$

Write the equation.

$y = 3(x+6)(x+3)$

9]



p = -6 q = 1 x = 2 y = -2

Find a. $y = a(x+6)(x-1)$

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

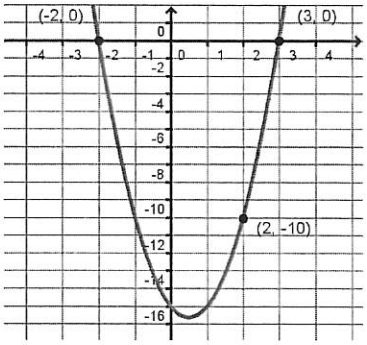
$-2 = a(8)$

$a = -1/4$

Write the equation.

$y = -1/4(x+6)(x-1)$

10]



p = -2 q = 3 x = 2 y = -10

Find a. $y = a(x+2)(x-3)$

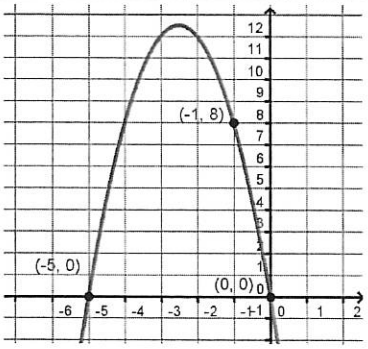
$-10 = a(2+2)(2-3)$

$a = 2.5$

Write the equation.

$y = 2.5(x+2)(x-3)$

11]



p = -5 q = 0 x = -1 y = 8

Find a. $y = a(x+5)(x)$

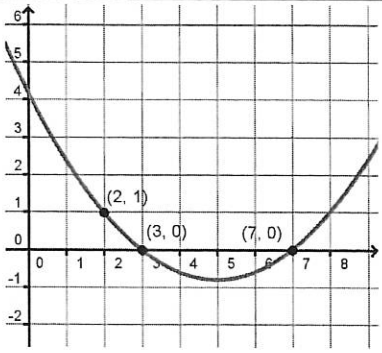
$8 = a(-1+5)(-1)$

$a = -2$

Write the equation.

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

12]



p = 3 q = 7 x = 2 y = 1

Find a. $y = a(x-3)(x-7)$

$1 = a(2-3)(2-7)$

$a = 1/5$

Write the equation.

$y = 1/5(x-3)(x-7)$

Write the quadratic function in standard form.

13] $y = \frac{1}{2}(x+4)(x-2)$

$y = 1/2(x^2 - 2x + 4x - 8)$

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

14] $y = -(x-1)(x-1)$

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

$y = -x^2 + 2x - 1$

15] $y = 3(x+3)(x+1)$

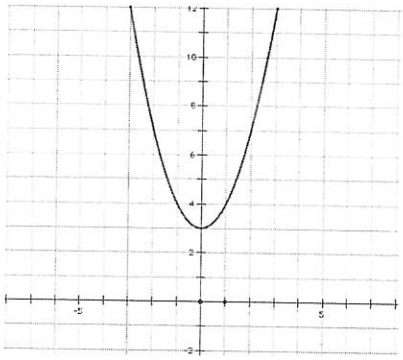
$y = 3(x^2 + 4x + 3)$

$y = 3x^2 + 12x + 9$

Write an equation of each graph below in the form $f(x) = a(x-h)^2 + k$.

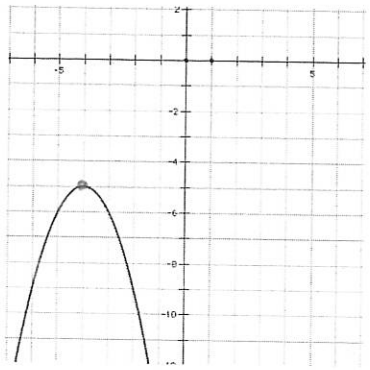
$f(x) = x^2 + 3$

33. $f(x) =$ $(x-0)^2 + 3$



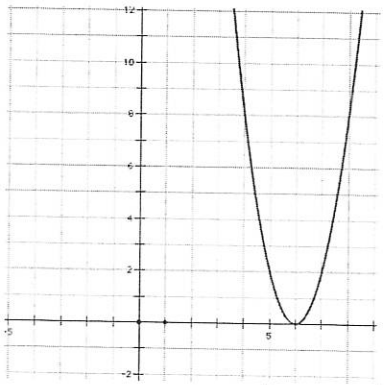
V: (0,3)
a = 1

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



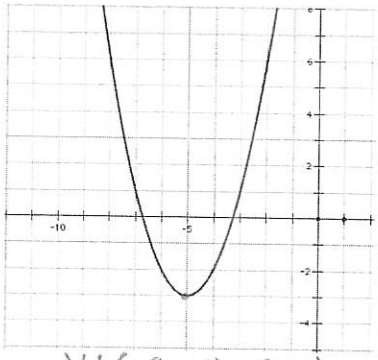
V: (-4, -5)
a = -1

35. $f(x) =$ $2(x-6)^2 + 0$



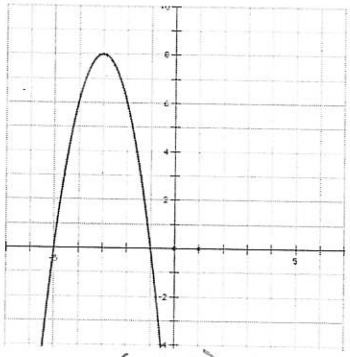
V: (6,0) a = 2

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



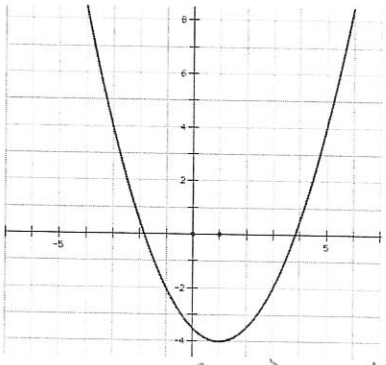
V: (-5,-3) a = 1

37. $f(x) =$ $-2(x+3)^2 + 8$



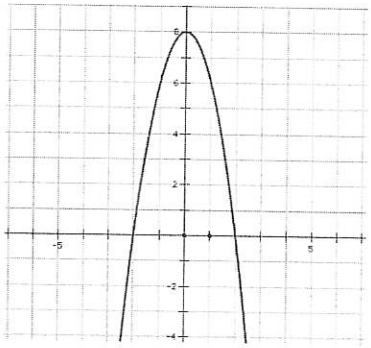
V: (-3,8) a = -2

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



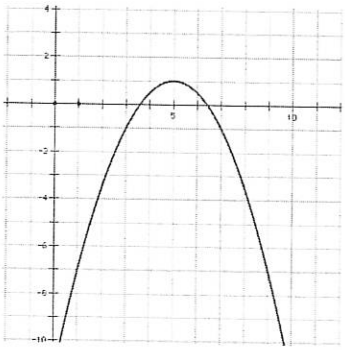
V: (1,-4) a = 1/2

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



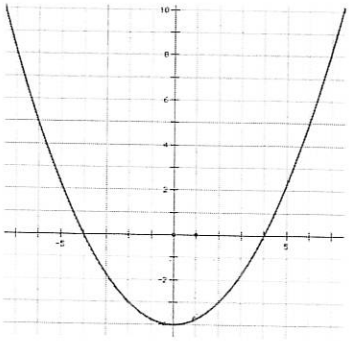
V: (0,8) a = -2

40. $f(x) =$ $-\frac{1}{2}(x-5)^2 + 1$



V: (5,1) a = -1/2

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



V: (0,-4) a = 1/4

$y = a(x+4)(x-4)$

$-4 = a(0+4)(0-4)$

$-4 = -16a$

$a = 1/4$