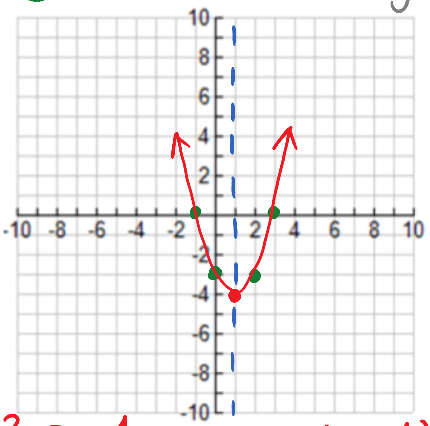
Honors Algebra
10.3 Solving Quadratics by Graphing

Name:
Period: Key

For 1-3, graph each parabola.

1. $y = x^2 - 2x - 3$ → (0,-3) y-int.

$y = (x-3)(x+1) \Rightarrow (3,0)$ & $(-1,0)$ x-intercepts



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

$x = 1$

$y = (1)^2 - 2(1) - 3 = -4$

Vertex: (1,-4)

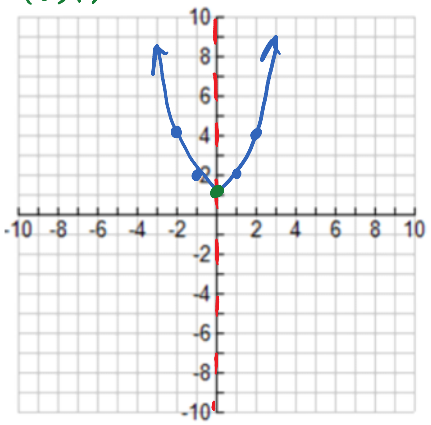
y-Intercept: (0,-3)

x-Intercept(s): (3,0) & (-1,0)

Vertex: (1,-4)

Axis of Symmetry: $x = 1$

2. $y = x^2 + 1$ (0,1)



$x = \frac{-b}{2a} = \frac{-0}{2(1)} = \frac{0}{2}$

$x = 0$

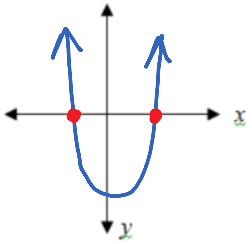
y-Intercept: (0,1)

x-Intercept(s): none

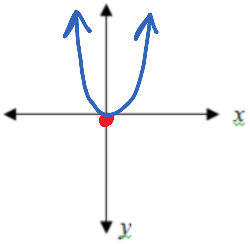
Vertex: (0,1)

Axis of Symmetry: $x = 0$

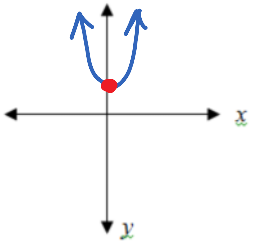
Number of Solutions of a Quadratic Equation



A quadratic equation has 2 solutions if the graph of its function has 2 x intercepts.



A quadratic equation has 1 solution if the graph of its function has 1 x intercept.



A quadratic equation has no solutions if the graph of its function has 0 x intercepts.

Identify how many solutions the following quadratic equations have. Then, find the x intercepts of the graph.

3. $y = 4x^2 + 16$ $y = 4(x^2+4)$ can't

4. $y = 5x^2 - 2x - 3$ $y = (5x+3)(x-1)$

5. $y = -x^2 + 6x - 9$ $y = -(x^2 - 6x + 9)$

3. $y = 4x^2 + 16$

$y = 4(x^2 + 4)$ ← can't factor

0 solutions

4. $y = 5x^2 - 2x - 3$

$y = (5x + 3)(x - 1)$

$5x + 3 = 0$

$5x = -3$

$x = -\frac{3}{5}$

$x - 1 = 0$

$x = 1$

2 solutions

$x = -\frac{3}{5}, 1$

5. $y = -x^2 + 6x - 9$

$y = -(x^2 - 6x + 9)$

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

$x - 3 = 0$

$x = 3$

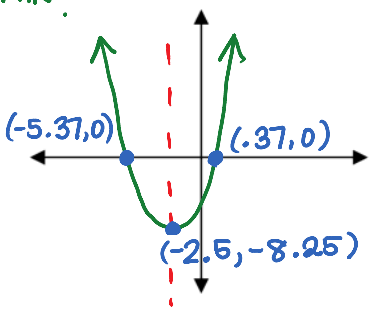
1 solution

$x = 3$

CALCULATOR TIME!

6. $y = x^2 + 5x - 2$ MIN!

WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=

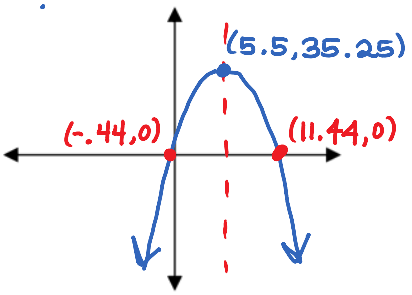


Find the vertex: (-2.5, -8.25)

Find the x-intercepts: (-5.37,0) & (0.37,0)

7. $y = -x^2 + 11x + 5$ MAX!

WINDOW
Xmin=-20
Xmax=20
Xscl=2
Ymin=-10
Ymax=50
Yscl=2
Xres=

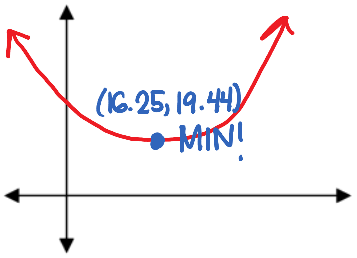


Find the vertex: (5.5, 35.25)

Find the x-intercepts: (-.44,0) & (11.44,0)

8. The suspension cables between the two towers of a bridge in Louisiana form a parabola that can modeled by the graph of $y = 0.04x^2 - 1.3x + 30$ where x and y are measured in feet.

WINDOW
Xmin=-5
Xmax=50
Xscl=5
Ymin=-5
Ymax=50
Yscl=5
Xres=



a. What is the height of the cable above the water at its lowest point?

≈ 19.44 ft

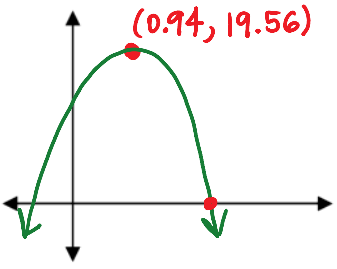
9. Two softball players are practicing catching fly balls. One player throws the ball upward from a height of 5.5 feet with an initial vertical velocity of 30 feet per second for her teammate to catch.

a. Write an equation that models the height h, in feet, of the softball as a function of time t, in seconds, after it is thrown. MAX!

$h = -16t^2 + V_0t + h_0$

$h = -16t^2 + 30t + 5.5$

WINDOW
Xmin=-1
Xmax=5
Xscl=1
Ymin=-5
Ymax=25
Yscl=5
Xres=



b. What was the height of the softball at its highest point? How long did it take for the shot put to

b. What was the height of the softball at its highest point? How long did it take for the shot put to reach its highest? 19.56ft after .94sec

c. If her teammate misses the ball and it lands on the ground, how long was the ball in the air? ZERO!

2.04 sec