

Unit 8 Day 8 Notes on Solving Quadratics by Graphing

Key

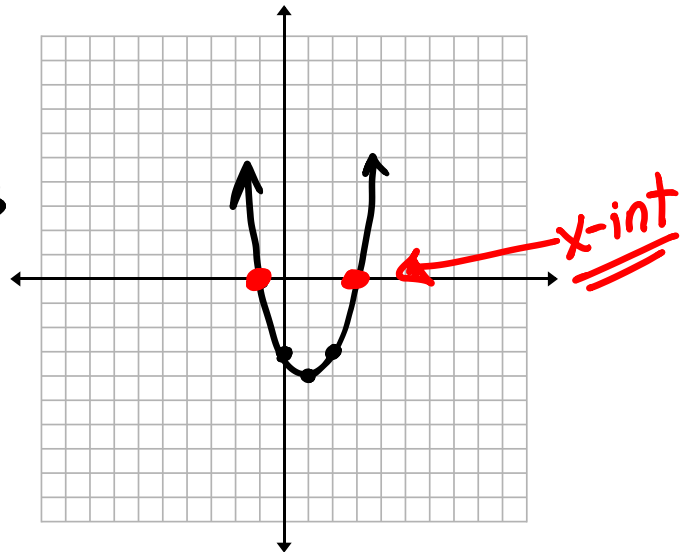
Graph the quadratic function: $y = x^2 - 2x - 3$ by identifying the following:

Axis of Symmetry: $x = \frac{2}{2(1)} = 1$ $x = 1$

Vertex: $(1, -4)$ $y = (1)^2 - 2(1) - 3$
 $y = -4$

Circle One: Maximum or Minimum

y-intercept: $(0, -3)$



Identify the x-intercept(s):

$(-1, 0)$ $(3, 0)$

**Solve the quadratic by factoring: $x^2 - 2x - 3 = 0$

$(x-3)(x+1) = 0$
 $x-3=0$ $x+1=0$
 $x=3$ OR $x=-1$

← same! →

You try!

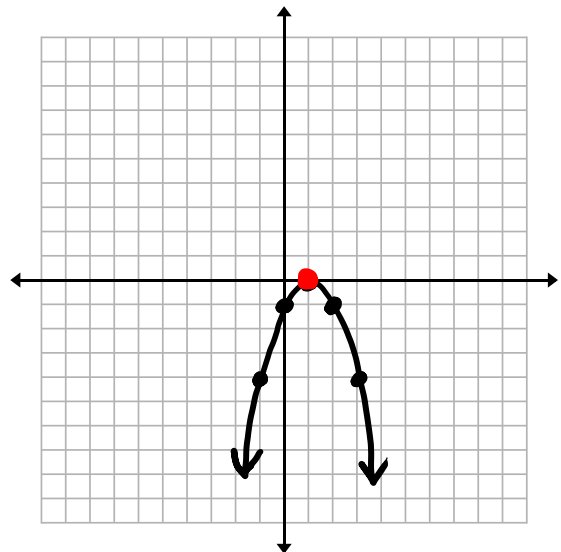
Graph the following quadratic equation: $y = -x^2 + 2x - 1$ by identifying the following:

Axis of Symmetry: $x = \frac{-2}{2(-1)} = 1$ $x = 1$

Vertex: $(1, 0)$ $y = -(1)^2 + 2(1) - 1$
 $y = 0$

Circle One: Maximum or Minimum

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



Identify the x-intercept(s):

$(1, 0)$

**Double-check by factoring! $-x^2 + 2x - 1 = 0$

$-1(x^2 - 2x + 1) = 0$
 $-1(x-1)(x-1) = 0$
 $x-1=0$ $x=1$

← same! →

What if I want to solve a quadratic equation and the x-intercepts are not rational?

Let's look at $x^2 - 4x + 1 = 0$. Perhaps our calculator could help us! Take it out ...

Start by graphing $y = x^2 - 4x + 1$

$$x = .268 \quad x = 3.732$$

Let's do another!

1. Solve $x^2 - 5x + 3 = 0$ by graphing.

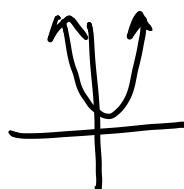
$$x = .697 \quad x = 4.303$$

(3 decimal places please :))

- ① put equation into y_1
- ② graph (ZOOM 6:standard)
- ③ 2nd Trace (Calc screen)
- ④ 2:Zero
- ⑤ Left Bound (go to left and ENTER)
- ⑥ Right Bound (go to right and ENTER)
- ⑦ Guess (just press ENTER)
- * ⑧ Do it all over again for the other x-intercept

Last one together!

2. Solve $5x^2 - 3x + 1 = 0$ by graphing.

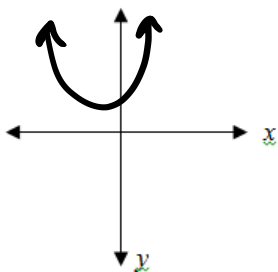
 doesn't cross the x-axis
* no solution

And one on your own ...

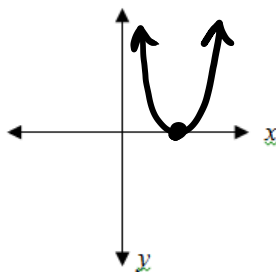
3. Solve $x^2 - 6x + 4 = 0$ by graphing.

$$x = .764, \quad x = 5.236$$

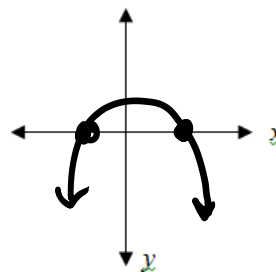
Number of Solutions of a Quadratic Equation



A quadratic equation has
NO Solutions
if the graph of its function
has 0 x intercepts.



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



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