

9-2

Solving a system of linear and quadratic equations graphically

Objective: I can solve a system of linear and/or quadratic equations graphically

Graphing Quadratics:

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

Vertex form
(h, k)
a = stretch

$$y = ax^2 + bx + c$$

Standard form
① complete the \square
② x-coord: $X = \frac{-b}{2a}$
y-coord: plug in X
a = stretch

Stretches

a=

x	y
-2	4
-1	1
0	0
1	1
2	4

x	y
-2	8
-1	2
0	0
1	2
2	8

$y=3x^2$

pts away from the vertex up

pts away	up
1	$1 \cdot 3 = 3$
2	$4 \cdot 3 = 12$
3	$9 \cdot 3 = 27$

Warm-Up

Graph $y = \frac{3}{2}x + 4$

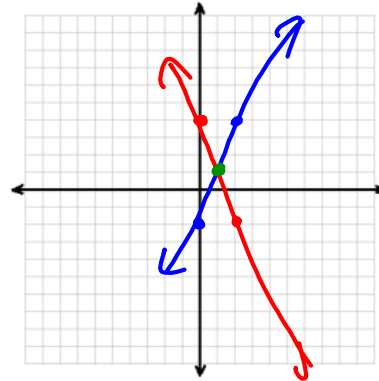
Graph $y = (x - 3)^2 + 2$

Graph $y = x^2 + 6x + 9$

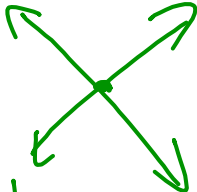
Graph the system:

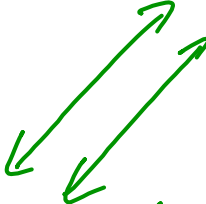
$$\begin{cases} y = -3x + 4 \\ y = 3x - 2 \end{cases}$$

$(1, 1)$



When solving a system of linear equations graphically, what did the SOLUTION look like?

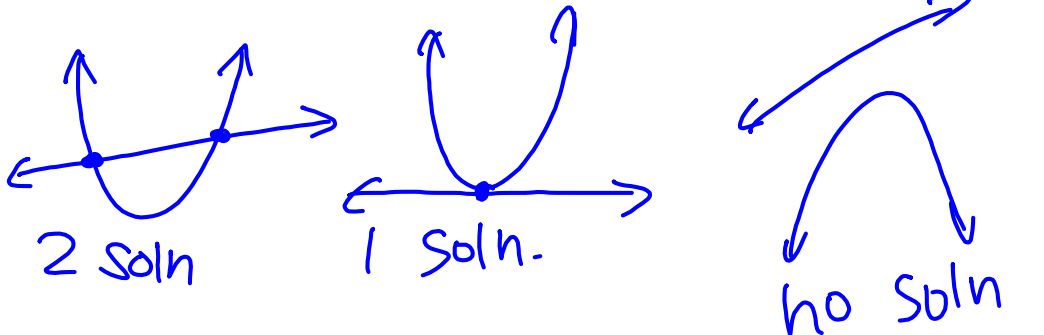

1 soln


no soln

where the 2 lines intersect


inf many

When solving a system of linear AND quadratic equations, what might the possible solutions look like?



Find the real solutions of the given system by graphing:

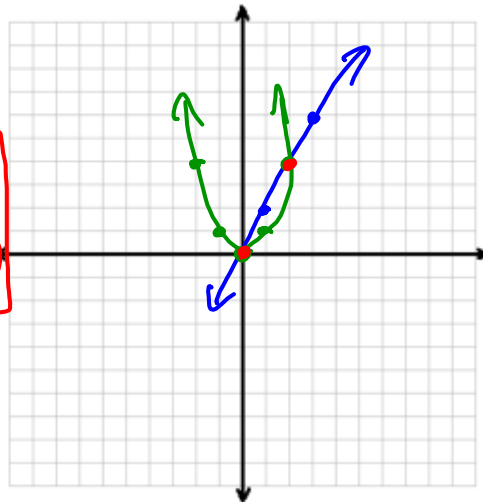
$$\begin{cases} y = x^2 & a=1 \\ y = 2x + 0 \end{cases}$$

$$V: (0, 0)$$

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

$$\frac{-0}{2(1)} = (0, 0)$$

$$\begin{matrix} (0, 0) \\ (2, 4) \end{matrix}$$

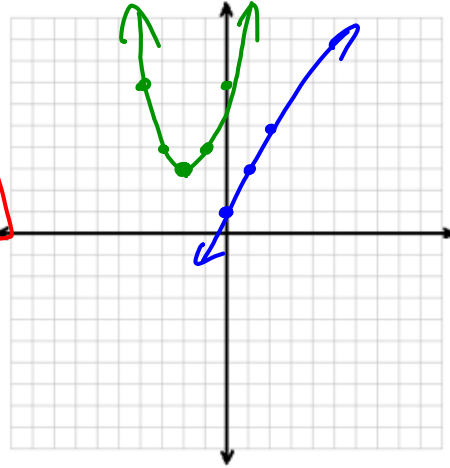


Find the real solutions of the given system by graphing:

$$\begin{cases} \bullet y = x^2 + 4x + 7 & a=1 \\ \bullet y = 2x + 1 \end{cases}$$

$$V: (-2, 3)$$

NO
Soln



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

$$y \rightarrow (-2)^2 + 4(-2) + 7$$

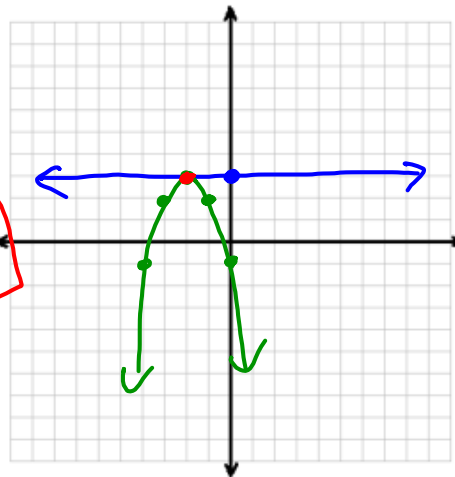
$$4 - 8 + 7 = 3$$

Find the real solutions of the given system by graphing:

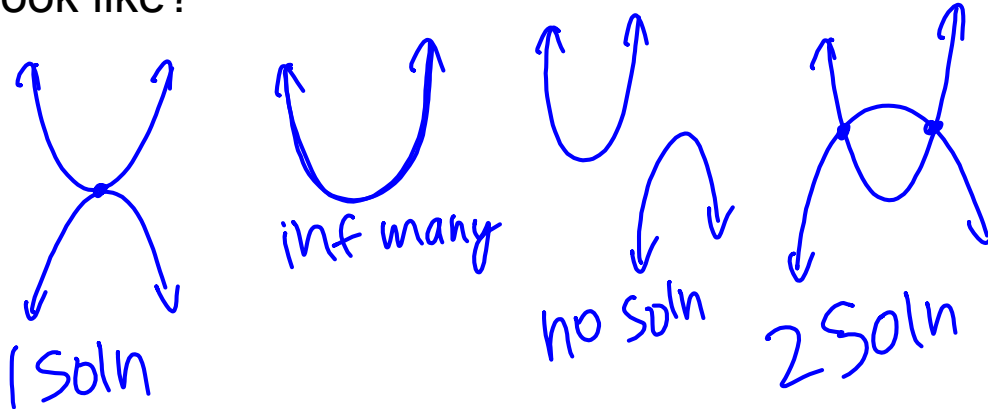
$$\begin{cases} \bullet y = -(x + 2)^2 + 3 & a=-1 \\ \bullet y = 3 \end{cases}$$

$$V: (-2, 3)$$

$(-2, 3)$



When solving a system of 2 quadratic equations, what might the possible solutions look like?



Find the real solutions of the given system by graphing:

$$\begin{cases} \bullet y = x^2 + 4x + 5 & a=1 \\ \bullet y = -x^2 + 2x + 2 & a=-1 \end{cases}$$

$$\bullet y = -x^2 + 2x + 2 \quad a=-1$$

$$V: (-2, 1)$$

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

$$y \rightarrow (-2)^2 + 4(-2) + 5$$

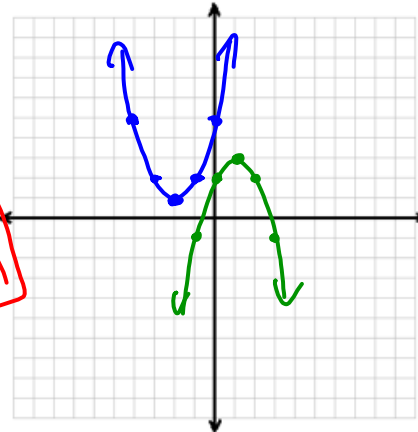
$$4 - 8 + 5 = 1$$

$$V: (1, 3)$$

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

$$- (1)^2 + 2(1) + 2$$

$$- 1 + 2 + 2 = 3$$



Find the real solutions of the given system by graphing:

$$\begin{cases} y = x^2 + 2 & a=1 \\ y = -x^2 + 2x + 2 & a=-1 \end{cases}$$

$$V: (0, 2)$$

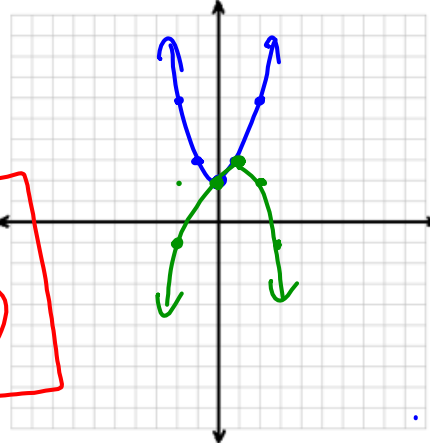
$$x = \frac{-0}{2(1)} = 0$$

$$y \rightarrow 0^2 + 2 = 2$$

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

$$-(1)^2 + 2(1) + 2 = -1 + 2 + 2 = 3$$

$$\begin{matrix} (0, 2) \\ (1, 3) \end{matrix}$$



Find the real solutions of the given system by graphing:

$$\begin{cases} y = (x - 3)^2 + 4 & a=1 \\ y = -2(x - 3)^2 + 4 & a=-2 \end{cases}$$

$$V: (3, 4)$$

$$V: (3, 4)$$

$$(3, 4)$$

