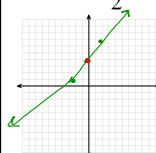10-2

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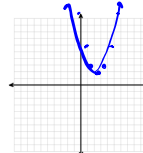
Objective: I can solve a system of linear and/or quadratic equations graphically

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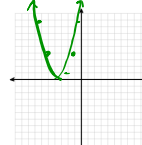Warm-Up

Graph $y = \frac{3}{2}x + 4$ Graph $y = (x-3)^2 + 2$ Graph $y = x^2 + 6x + 9$
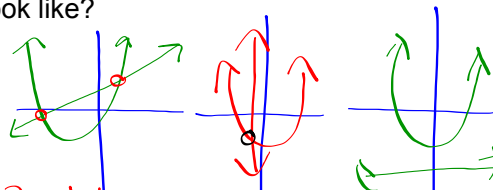
$y = (x+3)^2$

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

always where they cross

When solving a system of linear AND quadratic equations, what might the possible solutions look like?
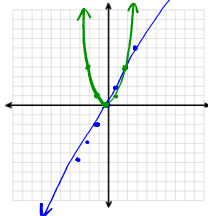
2 solutions   1 solution   No solution

Find the real solutions of the given system by graphing:

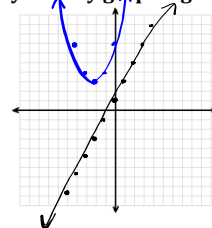$$\begin{cases} y = x^2 \\ y = \underline{2}x + 0 \\ \overline{1} \end{cases}$$

$(0,0) \text{ and } (2,4)$

Find the real solutions of the given system by graphing:

$$\begin{cases} y = x^2 + 4x + 7 \\ y = \underline{2}x + \underline{1} \\ \overline{1} \end{cases}$$

$\frac{4}{2} = 2^2 = 4$

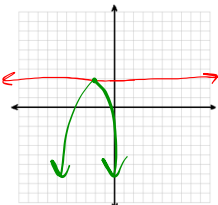$y = (x^2 + 4x + \underline{4}) + 7 - \underline{4}$

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

No solution

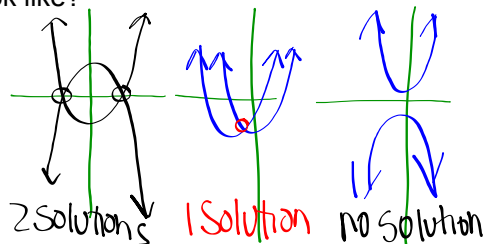**Find the real solutions of the given system by graphing:**

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

horizontal

$(-2, 3)$

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

2 Solutions   1 Solution   no solution

Find the real solutions of the given system by graphing:

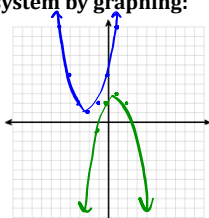$$\begin{cases} y = x^2 + 4x + 5 \\ y = -x^2 + 2x + 2 \end{cases}$$

$\frac{4}{2} = 2 \ 2^2 = 4$

$\frac{-2}{2} = -1^2 = 1$

$y = (x^2 + 4x + \underline{4}) + 5 - 4$

$\boxed{y = (x+2)^2 + 1}$

$y = -(x^2 - 2x + \underline{1}) + 2 + 1$
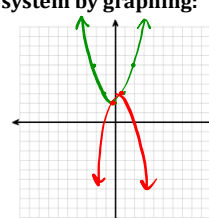
$\boxed{y = -(x-1)^2 + 3}$

no solution

Find the real solutions of the given system by graphing:

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

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

$(1, 3)$

$(0, 2)$

Find the real solutions of the given system by graphing:

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

$(3, 4)$