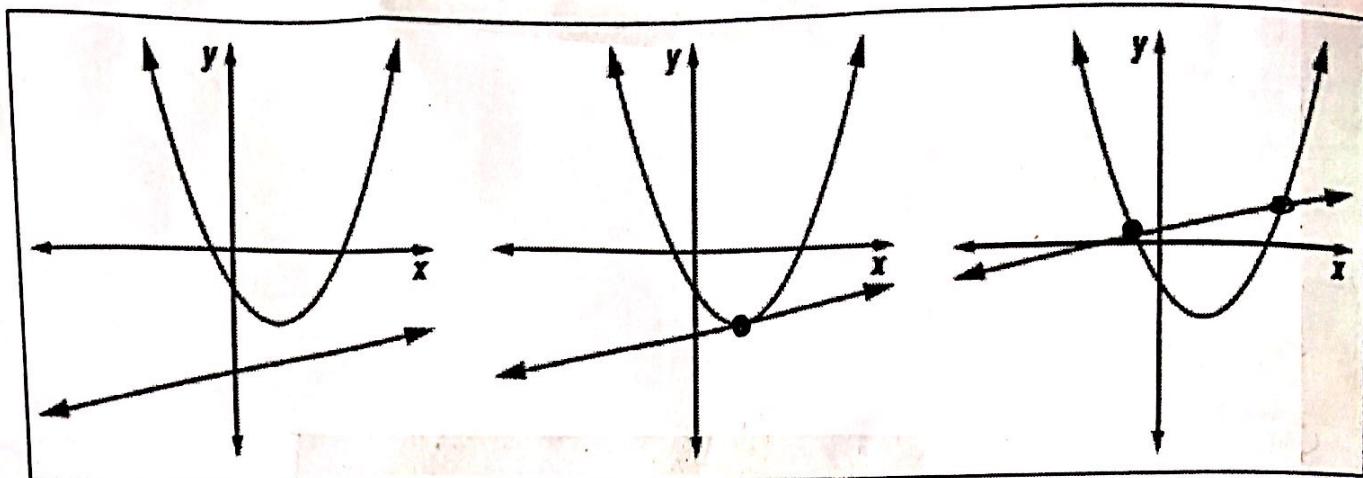


# Solving Systems of Quadratics



No Solutions

1 solution

2 solutions

Examples:

i)  $x^2 - x + 3 = 2x - 1$   
 $-2x + 1 \quad -2x + 1$

$a = 1 \quad b = -3 \quad c = 4$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(4)}}{2(1)}$$

$x^2 - 3x + 4 = 0$

$$x = \frac{3 \pm \sqrt{9 - 16}}{2} = \frac{3 \pm \sqrt{-7}}{2}$$

\*Imaginary Solutions\*

→ But we have a line → problem

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

**[NO SOLUTION]**

$$\text{ii) } \begin{array}{r} x^2 - 3x + 2 = x - 2 \\ -x + 2 \quad -x + 2 \end{array}$$

$$\begin{array}{l} y = x^2 - 3x + 2 \\ y = x - 2 \end{array}$$

$$x^2 - 4x + 4 = 0$$

$$(x-2)(x-2) = 0$$

$$\underline{x = 2}$$

\* 2 is the x-value of our solution

$$f(x) = x - 2$$

$$f(2) = 2 - 2 = 0$$

\* To find y-value we need to plug x into an original equation

**Solution: (2, 0)**

$$\text{iii) } \begin{array}{r} 10x^2 - 28x - 39 = 2x + 1 \\ -2x - 1 \quad -2x - 1 \end{array}$$

$$\begin{array}{l} y = 2x + 1 \\ y = 10x^2 - 28x - 39 \end{array}$$

**PLUG IT IN**

$$10x^2 - 30x - 40 = 0$$

$$10(x^2 - 3x - 4) = 0$$

$$10(x-4)(x+1) = 0$$

$$x-4 = 0$$

$$x = 4$$

$$x+1 = 0$$

$$x = -1$$

$$f(x) = 2x + 1$$

$$f(4) = 9$$

$$f(-1) = -1$$

**Solutions: (4, 9) (-1, -1)**

④ MUST SOLVE AT  
 LAST 2 Algebraically

Name: \_\_\_\_\_

**Systems of Equations**

Directions: Solve each system either algebraically or graphically. Show your work either way!  
 Remember, the highest exponent in these problems is 2, which means, because equations like that involve quadratics, that each system could have 0, 1, or 2 solutions.

Example:

$$\begin{cases} y = 3x^2 - 2x + 8 \\ y = 9 \end{cases}$$

Rewrite problem:

$$3x^2 - 2x + 8 = 9$$

Solution(s):  $(-\frac{1}{3}, 9) (1, 9)$

$$\begin{array}{r} -2 \quad | \quad -3 \\ -3+1 \quad | \quad -3 \cdot 1 \\ \hline 3x^2 - 2x - 1 = 0 \\ 3x^2 - 3x + 1x - 1 \end{array}$$

$$3(x-1) + 1(x-1)$$

1) Solve the system:

$$\begin{cases} y = x^2 + 5x - 7 \\ y = 10 \end{cases}$$

Rewrite problem:

$$x^2 + 5x - 7 = 10$$

Solution(s):  $(\frac{-5 - \sqrt{93}}{2}, 10) (\frac{-5 + \sqrt{93}}{2}, 10)$

$$x^2 + 5x - 17 = 0$$

$a = 1 \quad b = 5 \quad c = -17$

$$x = \frac{-5 \pm \sqrt{(5)^2 - 4(1)(-17)}}{2(1)}$$

$$x = \frac{-5 \pm \sqrt{93}}{2}$$

2) Solve the system:

$$\begin{cases} y = x^2 - 3x + 9 \\ y = x + 2 \end{cases}$$

Rewrite problem:

$$x^2 - 3x + 9 = x + 2$$

Solution(s): No Solution

$$x^2 - 4x + 7 = 0$$

3) Solve the system:

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

Rewrite problem:

$$2x^2 + x - 4 = -3x + 2 \quad \text{Solution(s): } (-3, 11) \quad (1, -1)$$

$$2x^2 + 4x - 6 = 0$$

$$2(x^2 + 2x - 3) = 0$$

$$2(x+3)(x-1) = 0$$

$$\begin{array}{r|l} +2 & -3 \\ \hline 2-1 & 3 \cdot -1 \end{array}$$

4) Solve the system:

$$\begin{cases} y = x^2 + 6x + 1 \\ y = -8 \end{cases}$$

Rewrite problem:

$$x^2 + 6x + 1 = -8 \quad \text{Solution(s): } (-3, -8)$$

$$\begin{array}{r|l} +6 & 9 \\ \hline 3+3 & 3 \cdot 3 \end{array}$$

$$x^2 + 6x + 9$$

$$(x+3)(x+3)$$

5) Solve the system:

$$\begin{cases} y = 2x^2 + 2x - 5 \\ y = -x^2 - 3x \end{cases}$$

Rewrite problem:

$$2x^2 + 2x - 5 = -x^2 - 3x \quad \text{Solution(s): } \left( \frac{-5 + \sqrt{85}}{6}, \right)$$

$$3x^2 + 5x - 5 = 0$$

$$a = 3 \quad b = 5 \quad c = -5$$

$$\begin{array}{r|l} 5 & -15 \\ \hline & \end{array}$$

$$x = \frac{-5 \pm \sqrt{(5)^2 - 4(3)(-5)}}{2(3)}$$

$$- \left( \frac{-5 - \sqrt{85}}{6} \right) - 3 \left( \frac{-5 - \sqrt{85}}{6} \right)$$

$$x = \frac{-5 \pm \sqrt{85}}{6}$$

$$\begin{array}{r|l} 3 & \left[ \frac{5 + \sqrt{85}}{6} \right] - \frac{-15 + 3\sqrt{85}}{-18} \\ \hline 30 + 6\sqrt{85} & 15 + 3\sqrt{85} \\ -14 & -18 \end{array} \quad \begin{array}{r|l} & -15 + 3\sqrt{85} \\ \hline & -18 \end{array}$$

85  
7  
5 n