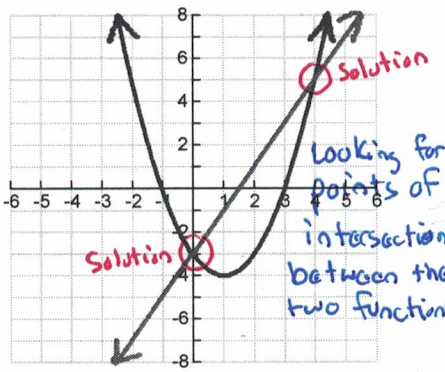
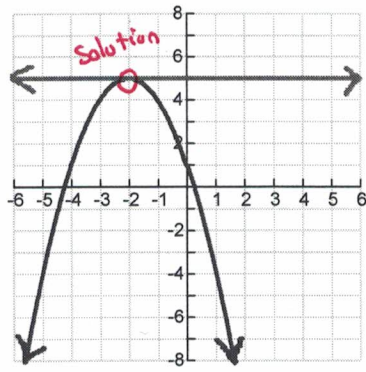
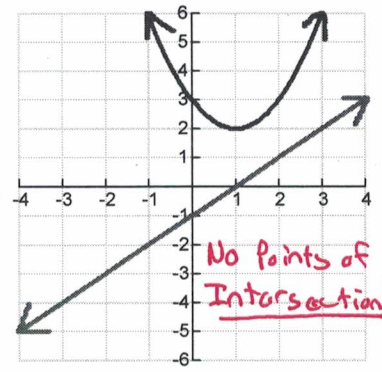


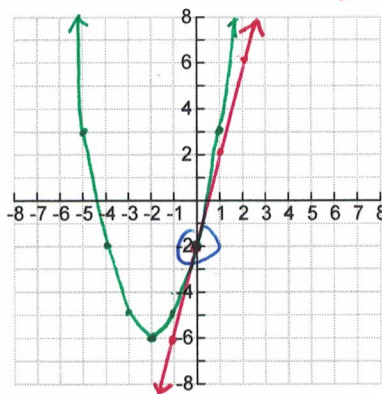
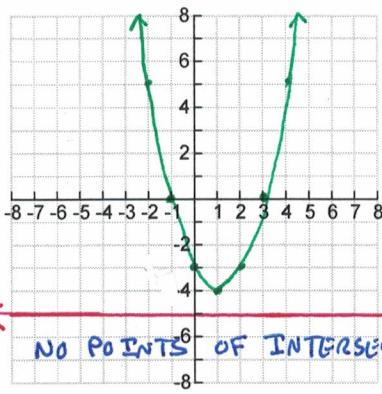
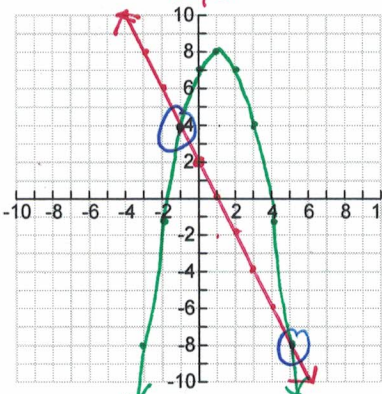
# Unit 2.9 – Solving Systems of Linear and Quadratic Equations

## Types of Solutions Produced By a Linear and Quadratic System

<p><b>Example 1:</b> <math>\begin{cases} y = x^2 - 2x - 3 \\ y = 2x - 3 \end{cases}</math></p> 	<p><b>Example 2:</b> <math>\begin{cases} y = -(x+2)^2 + 5 \\ y = 5 \end{cases}</math></p> 	<p><b>Example 3:</b> <math>\begin{cases} y = x^2 - 2x + 4 \\ y = x - 1 \end{cases}</math></p> 
<p>Number of Solution(s): <u>2</u> What are the solutions? <u>(0, -3) and (4, 5)</u></p>	<p>Number of Solution(s): <u>1</u> What are the solutions? <u>(-2, 5)</u></p>	<p>Number of Solution(s): <u>0</u> What are the solutions? <u>No solution or ∅</u></p>

\*Write your solution as an ordered pair (x, y) \*

## Solving Linear and Quadratic System By Graphing Examples

<p><b>Example 4a:</b> Vertex Form <math>(-2, -6)</math> <math>\begin{cases} y = (x+2)^2 - 6 \\ y = 4x - 2 \end{cases}</math> Slope-intercept <math>m=4</math> <math>y</math>-int <math>-2</math></p>  <p>Solution(s): <u>(0, -2)</u></p>	<p><b>Example 5a:</b> Standard Form <math>\begin{cases} y = x^2 - 2x - 3 \\ y = -5 \end{cases}</math> (Horizontal Line)</p>  <p>Solution(s): <u>∅</u></p>	<p><b>Example 6a:</b> <math>\begin{cases} y = -x^2 + 2x + 7 \\ y = -2x + 2 \end{cases}</math> Slope <math>\uparrow</math> <math>y</math>-int <math>\leftarrow</math></p>  <p>Solution(s): <u>(-1, 4) and (5, -8)</u></p>
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\*Graph 1 function at a time! \*

## Solving Linear and Quadratic System By Substitution (Rework Examples Above) Examples

<p><b>Example 4b:</b> <math>\begin{cases} y = (x+2)^2 - 6 \\ y = 4x - 2 \end{cases}</math></p> <p>Substitute in for y: <math>4x - 2 = (x+2)^2 - 6</math> Box or FOIL!</p> <p><math>4x - 2 = x^2 + 4x + 4 - 6</math></p> <p><math>4x - 2 = x^2 + 4x - 2</math> solve the quadratic</p> <p><math>-4x + 2</math>   <math>-4x + 2</math></p> <p><math>0 = x^2</math> Square Root Property</p> <p><math>\sqrt{0} = \sqrt{x^2}</math> <math>y = 4x - 2</math></p> <p><math>x = 0</math> <math>y = 4(0) - 2</math></p> <p><math>y = -2</math></p>	<p><b>Example 5b:</b> <math>\begin{cases} y = x^2 - 2x - 3 \\ y = -5 \end{cases}</math></p> <p><math>-5 = x^2 - 2x - 3</math></p> <p><math>+5</math>   <math>+5</math>   <math>-2x</math>   <math>+2x</math>   <math>-3</math>   <math>-3</math></p> <p><math>0 = x^2 - 2x + 2</math> Try to Factor!</p> <p>CANNOT FACTOR <math>\frac{-2x \pm 2}{1 \pm 2}</math></p> <p><b>NO SOLUTION</b></p>	<p><b>Example 6b:</b> <math>\begin{cases} y = -x^2 + 2x + 7 \\ y = -2x + 2 \end{cases}</math></p> <p><math>-2x + 2 = -x^2 + 2x + 7</math></p> <p><math>+2x - 2</math>   <math>+2x - 2</math></p> <p><math>0 = -x^2 + 4x + 5</math> Divide out a -1 to make "a" positive!</p> <p><math>0 = x^2 - 4x - 5</math> FACTOR!</p> <p><math>0 = (x-5)(x+1)</math></p> <p><math>x = 5</math>   <math>x = -1</math></p> <p><math>y = -2(5) + 2</math>   <math>y = -2(-1) + 2</math></p> <p><math>y = -8</math>   <math>y = 4</math></p> <p><b>(5, -8) (-1, 4)</b></p>
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This is only half of your solution. Plug it into a function to get y.

(0, -2)