Pre-Calculus 11 Enriched Systems of Equations & Inequalities

Lesson 2 Solving Systems of Equations Algebraically

Recall: Solving Linear Systems

Solve, using substitution

$$y = 4x - 4$$

$$2x + 3y = -5$$

$$2x + 3(4x - 4) = -5$$

$$2x + 12x - 12 = -5$$

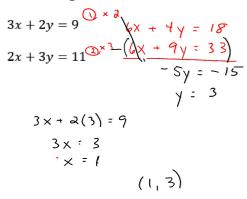
$$14x = 7$$

$$x = \frac{1}{2}$$

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

$$1 = -2$$

Solve, using elimination



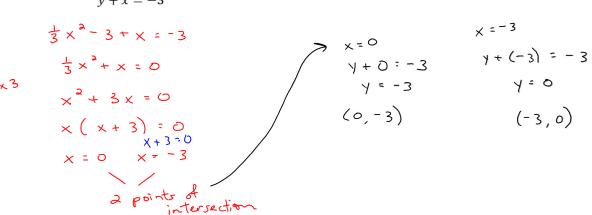
Linear-Quadratic

Example 1

Solve, algebraically.

$$y = \frac{1}{3}x^2 - 3$$

$$y + x = -3$$



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Example 2

Solve, algebraically.

$$x^{2} - y + 2 = 0$$

$$4x = 14 - y$$

$$x^{2} + \lambda = y$$

$$4x = 14 - (x^{2} + 2)$$

 $4x = 14 - x^{2} - 2$

$$x^{2} + 4x - 12 = 0$$

$$(x + 6)(x - 2) = 0$$

$$x = -6$$
 $x = 2$
 $y = (-6)^2 + 2$ $y = 2^2 + 2$
 $y = 6$

Quadratic - Quadratic

Example 3

Solve, algebraically.

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

$$y = x^2 - 4x - 5$$

$$(x+2)^{3}-1 = x^{3}-4x-5$$

 $x^{3}+4x+4-1 = x^{3}-4x-5$
 $8x = -8$
 $x = -1$

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

 $y = 0$

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Example 4 \times , \vee

Example 4 ×, \\
Two unknown numbers are related in the following ways. The square of the first number subtract the second number is equal to 5. The first number is equal to the second number subtract 7. Determine the numbers. \times

$$\begin{array}{c} x^2 - y = 5 \\ \hline x = y - 7 \\ \hline \end{array}$$

$$x^{2} - (x+7) = 5$$
 $x^{3} - x - 7 = 5$
 $x^{2} - x - 12 = 0$
 $(x-4)(x+3) = 0$
 $x = 4$

$$x = -3$$
 $y = 4 + 7$
 $y = -3 + 7$
 $= 11$
 $= 4$