## Warm-Up

(1 , 1)

5-3

$X = 1$

Solve the system algebraically

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

$3x - 2 = -3x + 4$
$\phantom{3x} +2 \qquad\qquad +2$
$3x = -3x + 6$
$+3x \qquad +3x$
$6x = 6$

$y = 3(1) - 2$
$y = 1$

Solve for x:   $x^2 - 2x - 24 = 0$

$-24$
$\boxed{6 \mid 4}$
$6 \mid -4$

$(x - 6)(x + 4) = 0$

$x - 6 = 0 \qquad x + 4 = 0$

$x = 6 \qquad\qquad x = -4$

Jan 9-12:08 PM

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5-3

Solving a system of linear and quadratic equations algebraically

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

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How can we SOLVE if we don't get integer solutions graphically?



Algebra

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When solving a system of linear equations algebraically, what methods can we use to solve?

Substitution

Elimination

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What are all the different ways we know how to SOLVE a QUADRATIC equation?

Factoring

Quadratic Formula

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**Find the real solutions of the given system algebraically :**

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

$x^2 = 2x$
$-2x \quad -2x$
$x^2 - 2x = 0$
$x(x - 2) = 0$
$x = 0$
$x - 2 = 0$
$x = 2$

(0 , 0)
(2 , 4)



(0 , 0)
(2 , 4)

$Y = 2x$
$Y = 2(0) = 0$
$Y = 2(2) = 4$

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**Find the real solutions of the given system algebraically :**

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

$x^2 + 4x + 7 = 2x + 1$

$\underline{\quad -2x - 1 \qquad -2x - 1 \quad}$

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

$a = 1$
$b = 2$
$c = 6$

**No Real Solutions**

$x = \dfrac{-(2) \pm \sqrt{4 - 24}}{2}$

$x = \dfrac{-2 \pm \sqrt{-20}}{2}$

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**Find the real solutions of the given system algebraically :**

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

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**Find the real solutions of the given system algebraically :**

$$\begin{cases} y = 6x^2 + 5x \\ y = 4x + 2 \end{cases}$$

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**Find the real solutions of the given system algebraically :**

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

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**Find the real solutions of the given system algebraically :**

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

$x^2 + 2 = -x^2 + 2x + 2$
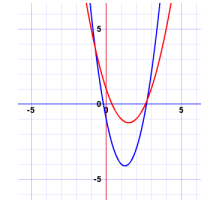
$\underline{+x^2 \qquad\quad +x^2 \quad}$

$2x^2$

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**Find the real solutions of the given system algebraically :**

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

**Find the real solutions of the given system algebraically :**

$$\begin{cases} y = 2x^2 - 5x - 1 \\ y = x^2 - 3x + 1 \end{cases}$$



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