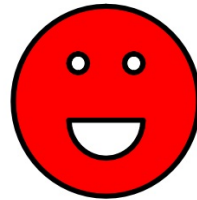


October 11, 2011

No Warm-up



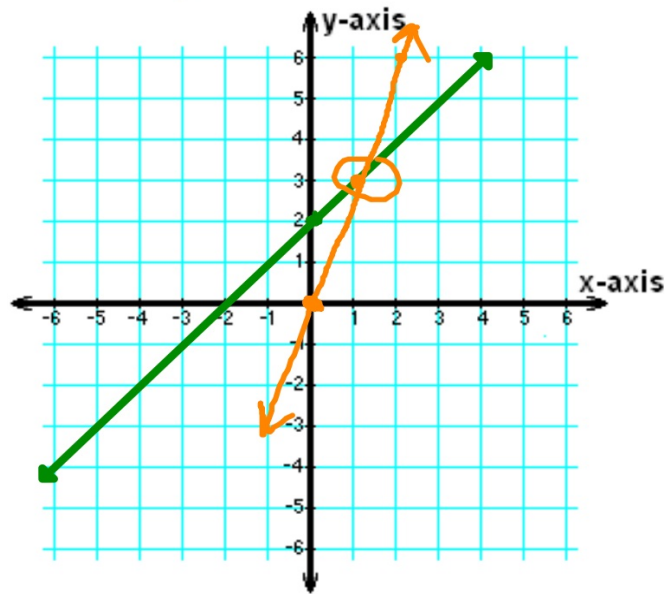
Get out your homework:

12 pts

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32)
$$\begin{cases} y = 3x + 0 \\ y = x + 2 \end{cases}$$

$$(1, 3)$$



10/11 - Solving Linear Systems Algebraically

Method 1: Substitution

1. Solve one equation for one variable.
2. Substitute that into the other equation
3. Solve for the variable
4. Substitute that value into an equation with both variables
5. Solve for the variable
6. Write the answer as a point.

Check it!!!

$$\begin{array}{l} \text{A} \\ \text{B} \end{array} \left\{ \begin{array}{l} -2x + y = 8 \\ 3x + y = -2 \end{array} \right.$$

$$\begin{array}{l} \text{A} \\ \rightarrow \text{B} \end{array} \begin{array}{l} y = 2x + 8 \\ 3x + (2x + 8) = -2 \\ 5x + 8 = -2 \\ 5x = -10 \\ x = -2 \end{array}$$

$$\begin{array}{l} y = 2x + 8 \\ y = 2(-2) + 8 \\ y = -4 + 8 \\ y = 4 \end{array} \quad (-2, 4)$$

Use the substitution method to solve the system.

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

$$x = 3 - 2y$$

$$5(3 - 2y) - 3y = 2$$

$$15 - 10y - 3y = 2$$

$$\begin{array}{r} 15 - 13y = 2 \\ -15 \qquad -15 \end{array}$$

$$\begin{array}{r} -13y = -13 \\ \hline -13 \qquad -13 \end{array}$$

$$y = 1$$

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

$$x = 3 - 2$$

$$x = 1$$

$$(1, 1)$$

Method 2: Linear Combination

1. Get equations in the same order
2. Multiply one/both rows by whatever it takes to get the coefficients on one variable to be opposites
3. Add the equations
4. Solve for the variable
5. Substitute that value into an equation with both variables
6. Solve for the variable
7. Write it as a point.

$$\begin{array}{l} A \\ B \end{array} \begin{cases} 4x - y = 2 \\ 5x + 2y = 9 \end{cases} \quad \text{already done}$$

$$\begin{array}{r} 2A \quad 8x - 2y = 4 \\ B \quad +5x + 2y = 9 \\ \hline 13x = 13 \end{array}$$

$$x = 1$$

$$\begin{array}{r} \rightarrow A \quad 4(1) - y = 2 \\ \quad \quad 4 - y = 2 \\ \quad \quad -y = -2 \\ \quad \quad \quad -y = -2 \end{array}$$

$$(1, 2) \quad y = 2$$

Solve the system using the linear combination method.

$$\begin{cases} \text{A} & 5x + 4y = 6 \\ \text{B} & -2x - 3y = -1 \end{cases}$$

$$\rightarrow \text{A} \quad 5(2) + 4y = 6$$

$$10 + 4y = 6$$

$$\begin{array}{r} -10 \\ \hline 4y = -4 \end{array}$$

$$\frac{4y}{4} = \frac{-4}{4}$$

$$y = -1$$

$$\begin{array}{r} 3\text{A} \quad 15x + 12y = 18 \\ 4\text{B} \quad -8x - 12y = -4 \\ \hline 7x = 14 \end{array}$$

$$\frac{7x}{7} = \frac{14}{7}$$

$$x = 2$$

$$(2, -1)$$

Use either method to solve the systems.

$$\begin{cases} (3x - 2y = 5) \cdot 2 \\ -6x + 4y = 7 \end{cases}$$

$$\begin{array}{r} \cancel{6x - 4y = 10} \\ + \cancel{-6x + 4y = 7} \\ \hline \end{array}$$

$0 \neq 17$
No solution

parallel
lines

$$\begin{cases} 6x - 4y = -10 \\ (-3x + 2y = 5) \cdot 2 \end{cases}$$

$$\begin{array}{r} \cancel{6x - 4y = -10} \\ + \cancel{-6x + 4y = 10} \\ \hline \end{array}$$

$0 = 0$
all of the points
on $6x - 4y = -10$

$$\{(x, y) : 6x - 4y = -10\}$$

Homework:

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Due tomorrow!