

Pg. 46

#3.

a) P.O.I. $(4, -1)$

b) Original System.

$$\begin{array}{l} \textcircled{1} \quad x - 2y = 6 \\ \textcircled{2} \quad 2x + 3y = 5 \end{array} \quad \left. \begin{array}{l} \text{P.O.I} \\ (4, -1) \\ \begin{array}{l} x \\ y \end{array} \end{array} \right\}$$

$$\textcircled{1} + \textcircled{2}$$

$$\begin{array}{r} x - 2y = 6 \\ 2x + 3y = 5 \\ \hline \end{array}$$

$$\textcircled{3} \quad 3x + y = 11$$

check $(4, -1)$

$$3x + y = 11$$

$$3(4) + (-1) = 11$$
$$12 - 1 = 11$$
$$11 = 11 \checkmark$$

$$\textcircled{2} - \textcircled{1}$$

$$\begin{array}{r} 2x + 3y = 5 \\ x - 2y = 6 \\ \hline \end{array}$$

$$\textcircled{4} \quad x + 5y = -1$$

check $(4, -1)$

$$x + 5y = -1$$
$$4 + 5(-1) = -1$$

is P.O.I
of $\textcircled{3}$ and $\textcircled{4}$

$$4 - 5 = -1$$
$$-1 = -1 \checkmark$$

- Multiplying a ^{linear} equation by a number doesn't change the graph

- Adding & Subtracting linear equations doesn't change the P.O.I.

* Allows us to manipulate equations to make it easier to eliminate one variable, without changing the P.O.I. *

Pg. 46 #6

$$\begin{array}{l} x+2y=2 \\ -2x-y=5 \end{array}$$

$\times 3$

$\times 2$

a) $3x + 6y = 6$ ① $x \text{ Int.} = 2$ $y \text{ Int.} = 1$ ①

$-4x - 2y = 10$ ② $\rightarrow y = mx + b$
 $y = -2x - 5$ ②

$2y = 4x + 10$
 $y = -2x - 5$

b) ① + ②

$$\begin{array}{r} 3x + 6y = 6 \\ -4x - 2y = 10 \\ \hline -x + 4y = 16 \end{array} \text{ ③}$$

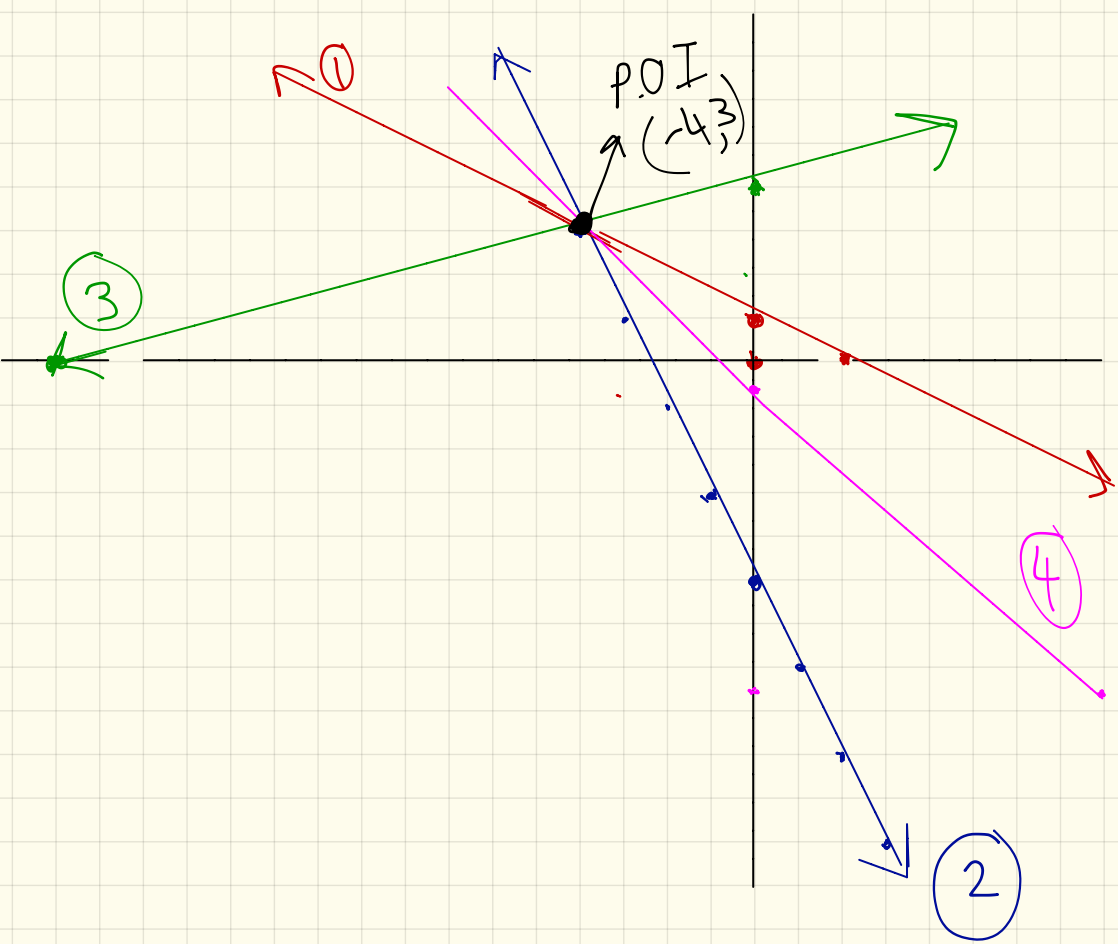
$x \text{ Int.} = -16$
 $y \text{ Int.} = 4$
③

① - ②

$$\begin{array}{r} 3x + 6y = 6 \\ -4x - 2y = 10 \\ \hline 7x + 8y = -4 \end{array} \text{ ④}$$

$$8y = -7x - 4$$

④ $y = -7/8x - 0.5$





SOLVING LINEAR SYSTEMS

Using Elimination

LEARNING GOAL

- Solve a linear system of equations using equivalent equations to remove a variable.

eliminate

The word "eliminate" is written in a black, cursive, handwritten style. A thin black arrow originates from the top of the word and points upwards and to the left, ending just above the word "remove" in the text above.

BIG IDEAS

● Elimination Strategy

from

- A method of removing a variable ~~from~~ a system of linear equations by creating an equivalent system in which the coefficients of one of the variables are the same or opposites.

BIG IDEAS (CONT.)

HOW TO SOLVE USING ELIMINATION:

1. Express both equations in the form $ax+by=c$.
2. Number the equations. ① and ②
3. Examine the two equations. Choose a variable to eliminate.
4. Multiply one or both equations by a number or numbers that results in a new equation ③, or equations ③ and ④, in which the chosen variable now have the same coefficient.
5. Add the equations (if the signs of the coefficients of the chosen variable are different) or subtract the equations (if the signs of the coefficients of the chosen variable are the same) to eliminate the chosen variable.
6. Substitute the value into one of the original two equations and solve for the remaining variable.
7. State the point of intersection.
8. Verify, if necessary.

Example

Solve the linear system

$$3x + 2y = 6 \quad (1)$$

$$x + 3y = 16 \quad (2) \times 3$$

$$3x + 9y = 48 \quad (3)$$

$$\begin{array}{r} (1) \quad 3x + 2y = 6 \\ (3) \quad 3x + 9y = 48 \\ \hline \end{array}$$

$$-7y = -42$$

$$\frac{-7y}{-7} = \frac{-42}{-7}$$

$$\boxed{y = 6}$$

Subst. into (2)

$$\therefore \text{P.O.I. } (-2, 6)$$

$$(1) - (3)$$

Check

$$3x + 2y = 6$$

Ls	Rs
$3(-2) + 2(6)$	6
$-6 + 12$	
6	

$$x + 3y = 16$$

Ls	Rs
$-2 + 3(6)$	16
$-2 + 18$	
16	

$$x + 3y = 16$$

$$x + 3(6) = 16$$

$$x + 18 = 16$$

$$\frac{x = 16 - 18}{\boxed{x = -2}}$$

Example

Solve

$$\begin{array}{l} \textcircled{1} \quad 3x + 2y = 22 \quad \textcircled{1} \times 2 \quad 6x + 4y = 44 \\ \textcircled{2} \quad 5x - 4y = 22 \quad \textcircled{3} \end{array}$$

$$\begin{array}{r} \textcircled{2} \quad 5x - 4y = 22 \\ \textcircled{3} \quad 6x + 4y = 44 \\ \hline 11x \quad = 66 \end{array} \quad \begin{array}{l} \textcircled{2} + \textcircled{3} \\ \swarrow \end{array}$$

$$\frac{11x}{11} = \frac{66}{11}$$

$$\boxed{x = 6}$$

sub into $\textcircled{1}$

$$3x + 2y = 22$$

$$3(6) + 2y = 22$$

$$18 + 2y = 22$$

$$2y = 22 - 18$$

$$2y = 4$$

$$\boxed{y = 2}$$

\therefore P.O.I.

$(6, 2)$

HW
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Unit Test
next Thursday
Sept. 29