

Solving Systems of Equations by Graphing

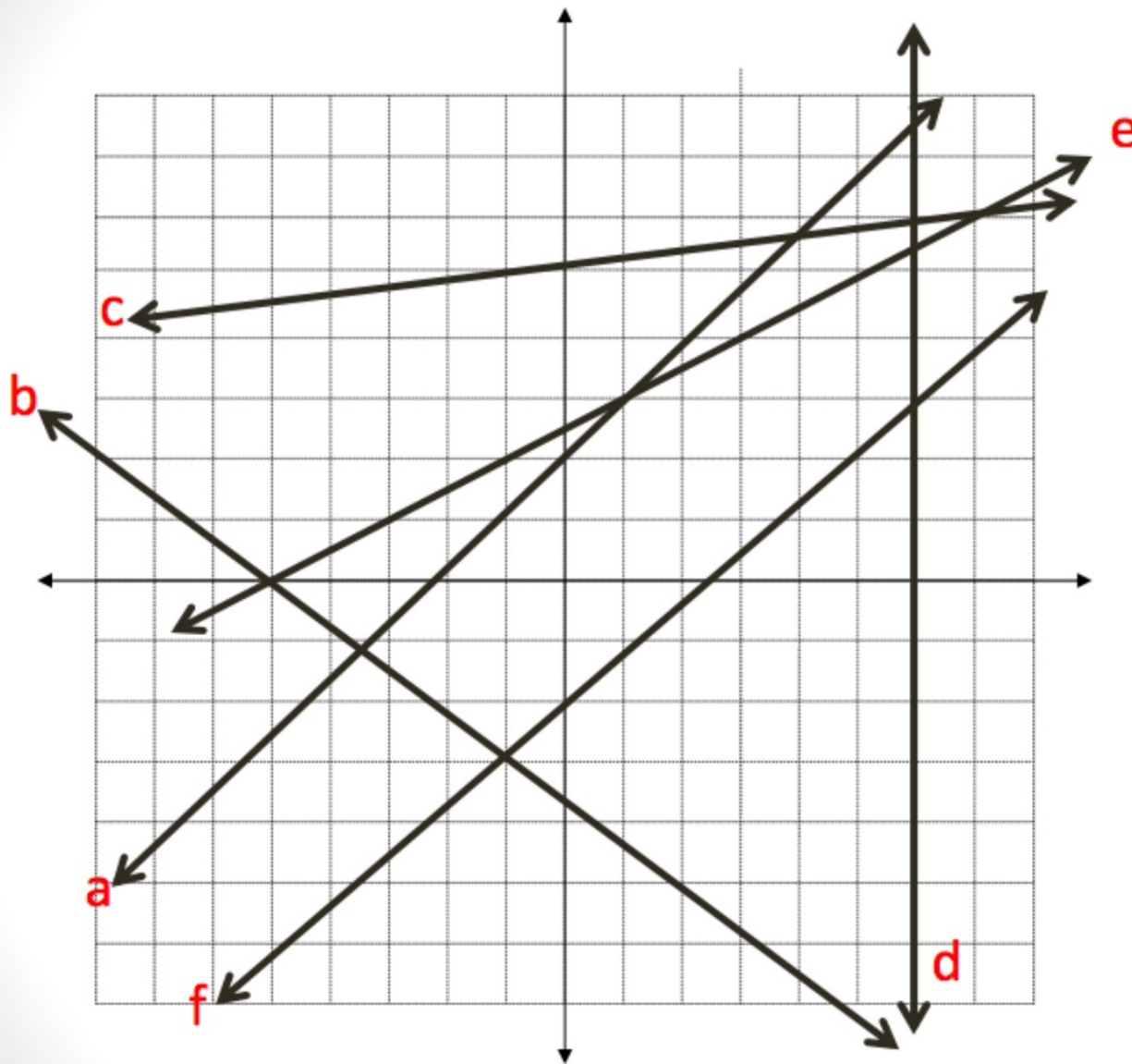
Objective: Students will be able to identify the common solution (if one exists) between two equations through graphing.

Introduction

- Graph the line $y = x + 4$ using a red pen.
- Graph the line $y = 2x - 1$ on the same graph using a pencil.
- What happened?
- Write the coordinates of the point where the lines intersect. Label x and y .
- Plug the point into the equation of each line?
- What happened?
- What conclusions can you make?

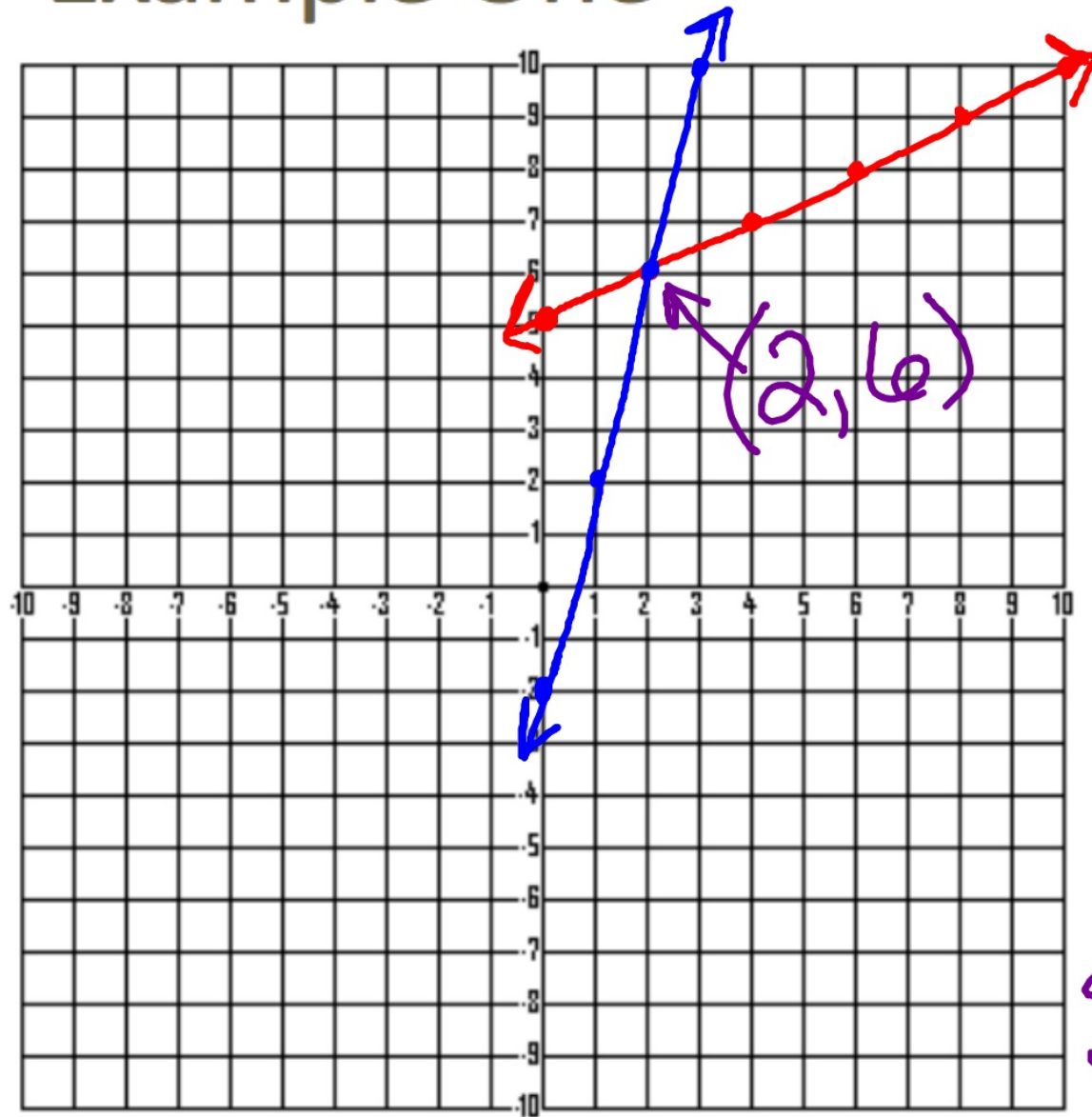
What are systems of equations?

- Systems of equations are multiple equations that share a common solution.
- There are many methods to solve systems of equations. We will focus on four:
 - Graphing
 - Substitution
 - Elimination
 - Calculator



- 1) f & b $(-1, -3)$
- 2) d & f $(6, 3)$
- 3) a & e $(1, 3)$
- 4) c & a $(4, 6)$
- 5) a & b $(-3.5, -1)$
- 6) b & e $(-5, 0)$
- 7) c & d $(6, 6)$
- 8) e & c $(7, 6)$

Example One



$$y = mx + b$$

$$y = \frac{1}{2}x + 5$$

$$y = 4x - 2$$

$$m = \frac{1}{2} = \frac{\text{rise}}{\text{run}}$$

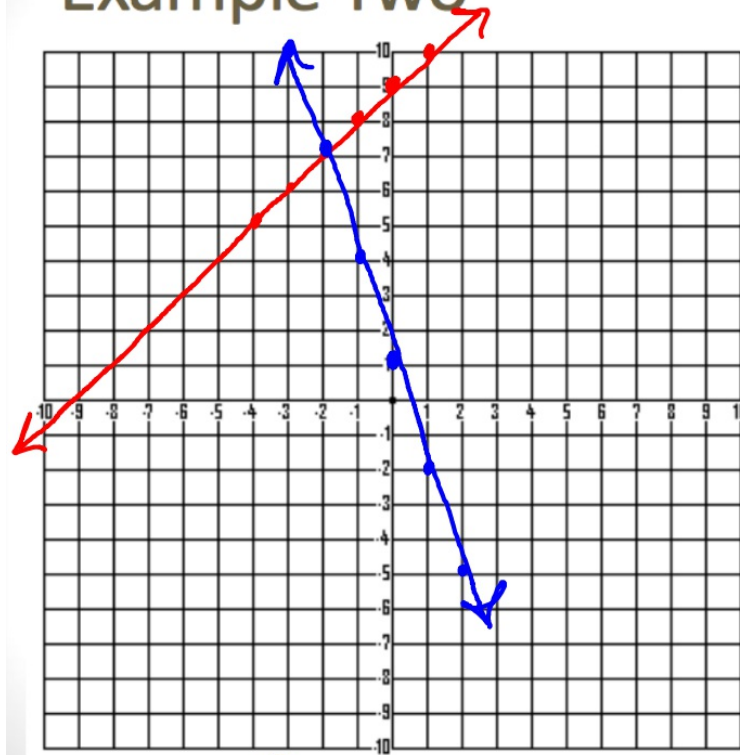
$$b = 5$$

$$m = \frac{4}{1} \begin{matrix} \text{rise} \\ \text{run} \end{matrix}$$

$$b = -2$$

$$\text{Solution} = (2, 6)$$

Example Two

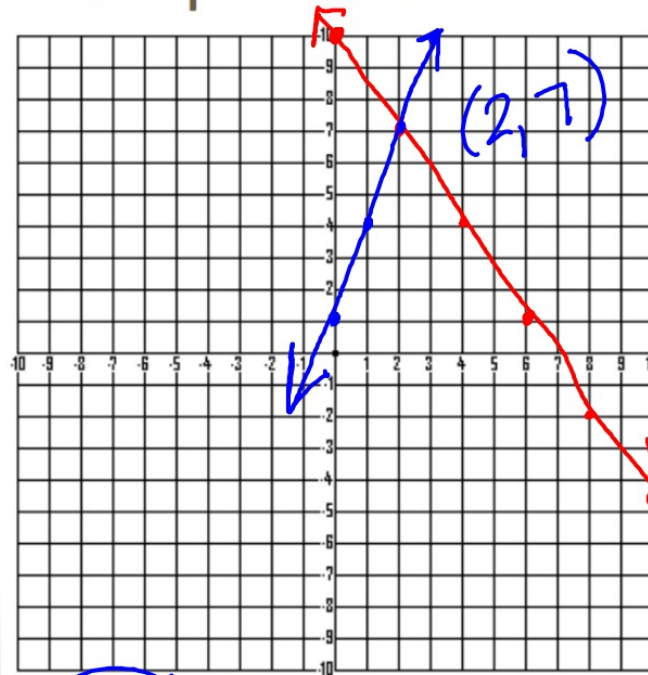


$$y = x + 9$$
$$y = -3x + 1$$
$$m = 1 = \frac{\text{rise}}{\text{run}}$$
$$b = 9$$
$$m = -3 = \frac{-3}{1}$$
$$b = 1$$
$$\text{Solution} = (-2, 7)$$

$$y = x + 9$$
$$7 = -2 + 9$$
$$\checkmark 7 = 7$$

$$y = -3x + 1$$
$$7 = -3(-2) + 1$$
$$7 = 6 + 1$$
$$\checkmark 7 = 7$$

Example Three



$$y = \underline{m}x + \underline{b}$$

$$3x + 2y = 20$$

$$-6x + 2y = 2$$

$$\begin{array}{r} \cancel{3x} + 2y = 20 \\ -\cancel{3x} = 2 \end{array}$$

$$\frac{2y}{2} = \frac{-3x + 20}{2}$$

$$y = -\frac{3}{2}x + 10$$

$$\begin{array}{r} -\cancel{6x} + 2y = 2 \\ +\cancel{6x} = 2 \end{array}$$

$$\frac{2y}{2} = \frac{6x + 2}{2}$$

$$y = 3x + 1$$

x y

• Is **(3, 6)** a solution to this system of equations?

• $2x + 7y = 48 \rightarrow 2(3) + 7(6) \stackrel{?}{=} 48$

• $5x + 3y = 51$
 $5(3) + 3(6) \stackrel{?}{=} 51$

(3, 6) is / is not a solution because
_____.

- **Is $(2, 5)$ a solution to this system of equations?**
- $y = 2x + 1$
- $2x + 2y = 15$

$(2, 5)$ _____ a solution because
_____.