

**Section 4.1a – Practice Problems**

**EMERGING LEVEL QUESTIONS**

Determine whether the ordered pairs are a solution to the linear system

1.  $3x + y = 17$  and  $2x + 3y = 17$ ;  $(5, 2)$

$$\begin{array}{l} 3(5) + 2 = 17 \quad 2(5) + 3(2) = 17 \\ 15 + 2 = 17 \quad 10 + 6 = 17 \\ 17 = 17 \quad 16 = 17 \\ \checkmark \quad \rightarrow \quad \checkmark \leftarrow \quad \checkmark \\ \text{no} \end{array}$$

2.  $2x + y = 11$  and  $3x + 2y = 19$ ;  $(3, 5)$

$$\begin{array}{l} 2(3) + 5 = 11 \quad 3(3) + 2(5) = 19 \\ 6 + 5 = 11 \quad 9 + 10 = 19 \\ 11 = 11 \quad 19 = 19 \\ \checkmark \quad \rightarrow \quad \checkmark \leftarrow \quad \checkmark \\ \text{yes} \end{array}$$

3.  $x + 2y = -2$  and  $2x + 5y = 23$ ;  $(2, -4)$

$$\begin{array}{l} 2 + 2(-4) = -2 \quad 2(2) + 5(-4) = 23 \\ 2 + (-8) = -2 \quad 4 + (-20) = 23 \\ -6 = -2 \quad -16 = 23 \\ \times \quad \rightarrow \quad \times \leftarrow \quad \times \\ \text{no} \end{array}$$

4.  $4x = 72 - y$  and  $3x = -7y - 4$ ;  $(6, -2)$

$$\begin{array}{l} 4(6) = 72 - (-2) \quad 3(6) = -7(-2) - 4 \\ 24 = 74 \quad 18 = 14 - 4 \\ \times \quad \rightarrow \quad \times \leftarrow \quad \times \\ \text{no} \end{array}$$

5.  $-2y = x + 10$  and  $3x = 6y - 6$ ;  $(-6, -2)$

$$\begin{array}{l} -2(-2) = -6 + 10 \quad 3(-6) = 6(-2) - 6 \\ 4 = 4 \quad -18 = -12 - 6 \\ \checkmark \quad \rightarrow \quad \checkmark \leftarrow \quad \checkmark \\ \text{yes} \end{array}$$

6.  $x = 2$  and  $y = 3$ ;  $(3, 2)$

$$\begin{array}{l} 3 = 2 \quad 2 = 3 \\ \times \rightarrow \times \leftarrow \times \\ \text{no} \end{array}$$

PROFICIENT LEVEL QUESTIONS

7.  $\frac{1}{2}x + \frac{1}{3}y = 4$  and  $\frac{1}{4}x + \frac{1}{3}y = 3$ ; (4, 6)

$\frac{1}{2}(4) + \frac{1}{3}(6) = 4$        $\frac{1}{4}(4) + \frac{1}{3}(6) = 3$

$2 + 2 = 4$                        $1 + 2 = 3$   
 $4 = 4$                                $3 = 3$   
 ✓                                      ✓                                      ✓  
yes

8.  $0.3x - 0.2y = 4$  and  $0.2x + 0.3y = 1$ ;  
 $(\frac{140}{13}, \frac{-50}{13})$

$\frac{3}{10}(\frac{140}{13}) - \frac{1}{5}(\frac{-50}{13}) = 4$        $\frac{1}{5}(\frac{140}{13}) + \frac{3}{10}(\frac{-50}{13}) = 1$

$\frac{42}{13} - (\frac{-10}{13}) = 4$                        $\frac{28}{13} - \frac{15}{13} = 1$   
 $\frac{52}{13} = 4$                                        $\frac{13}{13} = 1$   
 $4 = 4$      $1 = 1$   
 ✓    ✓    ✓  
yes

Solve by graphing

9.  $2x - y = 3$  and  $x + y = 3$

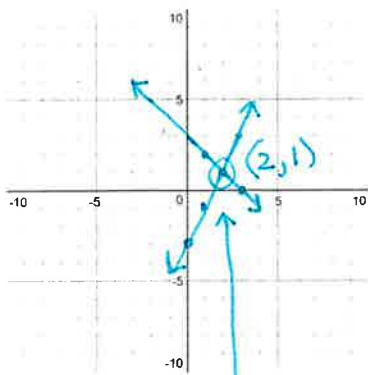
$2x - y = 3$

$2x = y + 3$

$y = 2x - 3$

$x + y = 3$

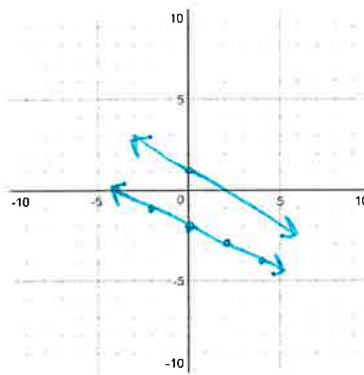
$y = -x + 3$



find point of intersection

(2, 1)

10.  $x + 2y = -4$  and  $y = -\frac{1}{2}x + 1$



$x + 2y = -4$

$2y = -x - 4$

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

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

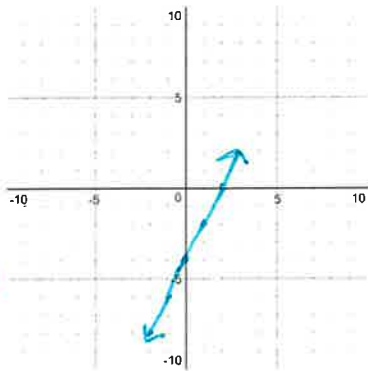
same slope different y-inter so, never cross\*

DNE

11.  $f(x) = 2x - 4$  and  $2x - y = 4$

$f(x) = 2x - 4$   
 $2x - y = 4$   
 $2x = y + 4$   
 $y = 2x - 4$

same line so, infinite solutions

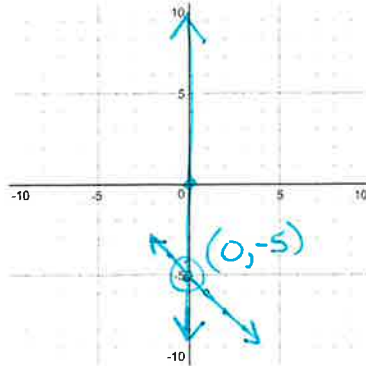


**infinite**

12.  $x + y = -5$  and  $-2x + 1 = 1$

$x + y = -5$   
 $y = -x - 5$

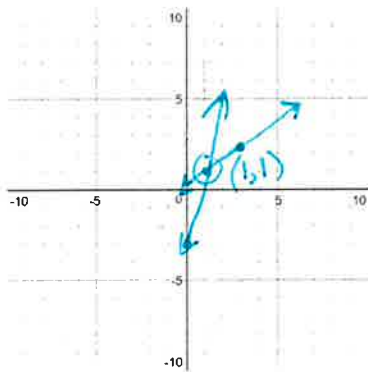
$-2x + 1 = 1$   
 $-2x = 0$   
 $x = 0$



**(0, -5)**

13.  $2x - 3y = -1$  and  $4x - y = 3$

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



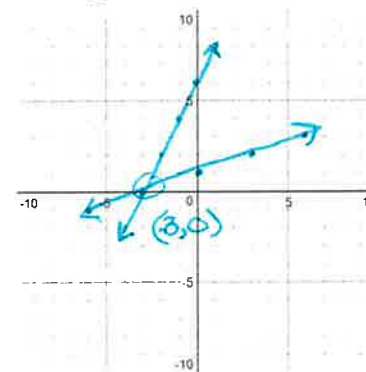
**(1, 1)**

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

14.  $x - \frac{y}{2} = -3$  and  $\frac{x}{3} - y = -1$

$x - \frac{y}{2} = -3$   
 $2x - y = -6$   
 $2x = y - 6$   
 $y = 2x + 6$

$\frac{x}{3} - y = -1$   
 $x - 3y = -3$   
 $x = 3y - 3$   
 $x + 3 = 3y$   
 $y = \frac{1}{3}x + 1$



**(3, 0)**

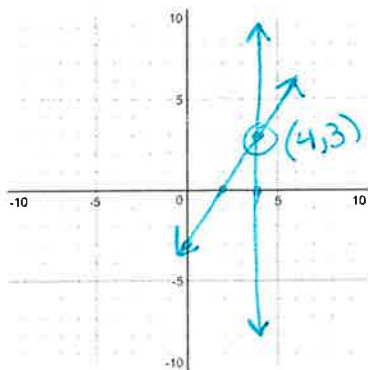
15.  $x = 4$  and  $3x - 2y = 6$

$$3x - 2y = 6$$

$$3x = 2y + 6$$

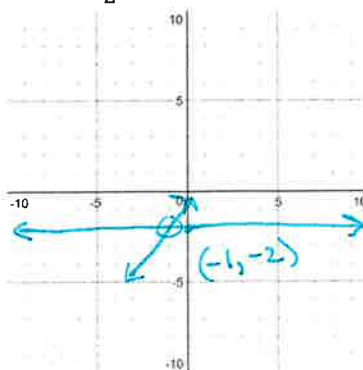
$$3x - 6 = 2y$$

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



$(4,3)$

16.  $2x - \frac{3}{2}y = 1$  and  $f(x) = -2$



$$f(x) = -2$$

$$y = -2$$

$(-1, -2)$

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

$$4x - 3y = 2$$

$$4x = 2 + 3y$$

$$4x - 2 = 3y$$

$$y = \frac{4}{3}x - \frac{2}{3}$$

17.  $f(x) = -x - 1$  and  $4x - 3y = 17$

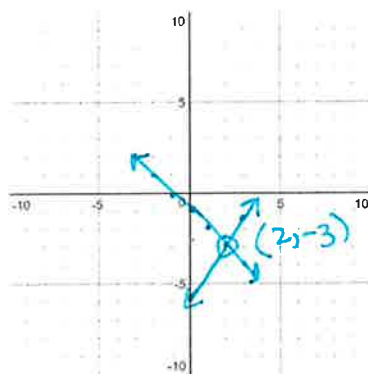
$$f(x) = -x - 1$$

$$4x - 3y = 17$$

$$4x = 17 + 3y$$

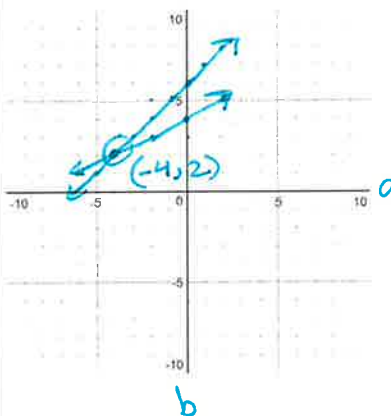
$$4x - 17 = 3y$$

$$y = \frac{4}{3}x - \frac{17}{3}$$



$(2, -3)$

18.  $a - 2b = -8$  and  $b - a = 6$



$(-4, 2)$

$$a - 2b = -8$$

$$a = 2b - 8$$

$$a + 8 = 2b$$

$$b = \frac{1}{2}a + 4$$

$$b - a = 6$$

$$b = a + 6$$

EXTENDING LEVEL QUESTIONS

19. Write a system of equations with the given solution.

a)  $(3, -2)$

$y = mx + b$   
 plug in point  $\rightarrow -2 = m(3) + b$   
 choose  $m$  value  $\rightarrow -2 = (2)(3) + b$   
 solve for  $b \rightarrow -2 = 6 + b$   
 $b = -8$

$$\begin{aligned} y &= 2x - 8 \\ \text{and} \\ y &= 3x - 11 \end{aligned}$$

repeat steps

$$\begin{aligned} y &= mx + b \\ -2 &= m(3) + b \\ -2 &= (3)(3) + b \\ -2 &= 9 + b \\ b &= -11 \end{aligned}$$

b) No solution

No solution means same slope ( $m$ ) value

$$\begin{aligned} y &= 2x + 3 \\ \text{and} \\ y &= 2x - 5 \end{aligned}$$

c) Infinite Solution

Infinite Solution means same line

$$\begin{aligned} y &= 2x + 1 \\ \text{and} \\ 2x &= y - 1 \end{aligned}$$