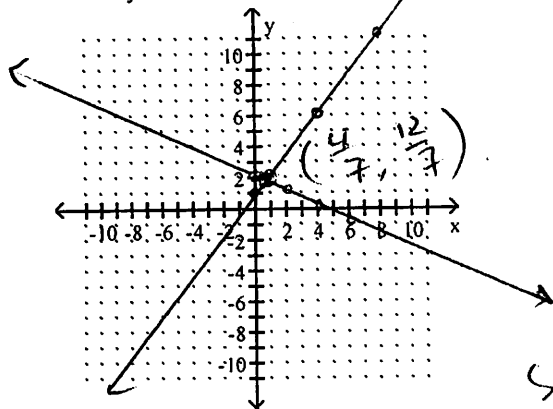


Show all work neatly and systematically for full credit. Total points: 102 (6 points each).

(6) Solve the system graphically.

1)  $x + 2y = 4$   
 $5x - 4y = -4$



*Should NOT use this method*

Solution:  $\left\{ \left( \frac{4}{7}, \frac{12}{7} \right) \right\}$

$x + 2y = 4$

$2y = -x + 4$

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

$m = -\frac{1}{2}$

$(0, 2)$

$5x - 4y = -4$

$-4y = -5x - 4$

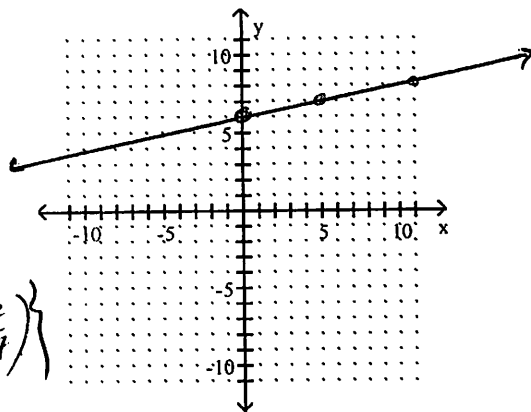
$y = \frac{5}{4}x + 1$

$m = \frac{5}{4}$

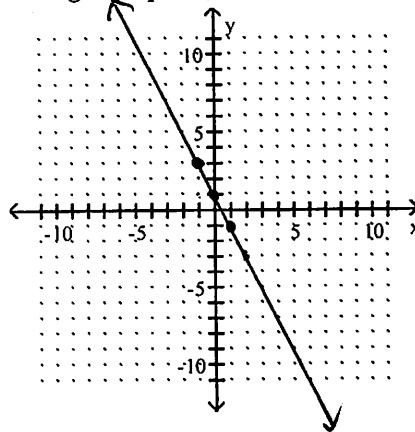
$(0, 1)$

(6) Draw lines.

3) a. Draw a line that has Slope  $\frac{1}{5}$ ; and y-intercept  $(0, 6)$



b. Draw a line that has slope -2 and passes through the point  $(-1, 3)$ .



$m = -\frac{2}{1}$   
 $(-1, 3)$

(6) Solve.

2) The perimeter of a rectangular building is 212 feet. The width is 48 feet shorter than the length. What are the dimensions? (Let W represent the width and L represent the length.)

Length: L

Width: W

$\begin{cases} 2L + 2W = 212 \\ W = L - 48 \end{cases}$

$2L + 2(L - 48) = 212$       $W = 77 - 48$

$2L + 2L - 96 = 212$       $= 29$

$4L - 96 = 212$

$4L = 308$

$L = 77$

Hence, the dimensions are 77 ft by 29 ft

(6) Solve.

4)  $7x + 2y = -24$  |  $\times (-2)$   
 $5x + 4y = -12$

$\Rightarrow \begin{cases} -14x - 4y = +48 \\ 5x + 4y = -12 \end{cases} \quad (+)$

$-9x = 36$

$x = -4$

$7(-4) + 2y = -24$

$-28 + 2y = -24$

$2y = 4$

$y = 2$

$\left\{ (-4, 2) \right\}$

(6) Solve.

$$\begin{cases} 5) 7x + y = -13 \\ -8x + y = 17 \end{cases} \quad (-1)$$

$$\Rightarrow \begin{cases} -7x - y = 13 \\ -8x + y = 17 \end{cases} \quad (+)$$


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$$-15x = 30$$

$$x = -2$$

$$7x + y = -13$$

$$7(-2) + y = -13$$

$$-14 + y = -13$$

$$y = 1$$

$$\{(-2, 1)\}$$

(6) Find the intercepts for the equation.

$$6) -2x - 5y = -4$$

$$\text{a. x-intercept: } (2, 0)$$

$$y = 0 \quad -2x - 5(0) = -4$$

$$-2x = -4$$

$$x = 2$$

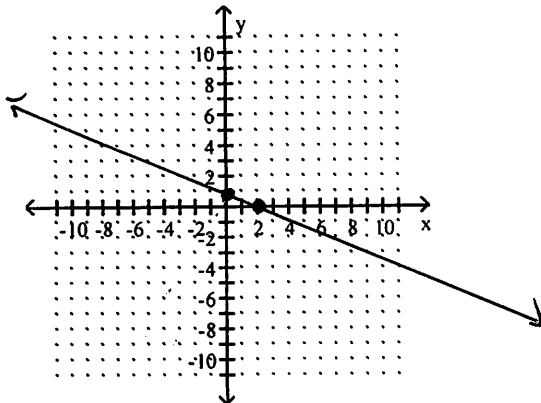
$$\text{b. y-intercept: } (0, \frac{4}{5})$$

$$x = 0 \quad -2(0) - 5y = -4$$

$$-5y = -4$$

$$y = \frac{4}{5}$$

c. Graph the equation.



(6) Find the slopes.

7) a. A line passing through the points  $(-6, 8)$  and  $(5, 3)$ . Find the slope.

$$m = \frac{3 - 8}{5 - (-6)}$$

$$= \frac{-5}{11}$$

b. A vertical line passing through  $(-2, 3)$ . Find the slope.

Slope is undefined

c. A horizontal line passing through  $(-1, 7)$ . Find the slope.

$$m = 0$$

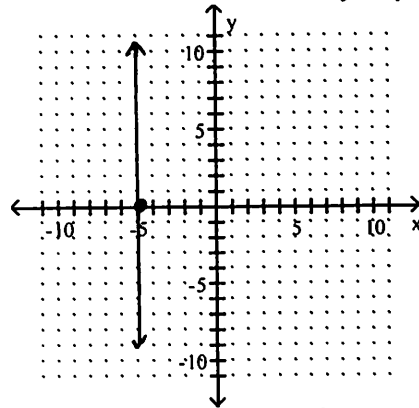
(6) Graph the equations.

8) a.  $8x = -40$

$$8x = -40$$

$$x = -5$$

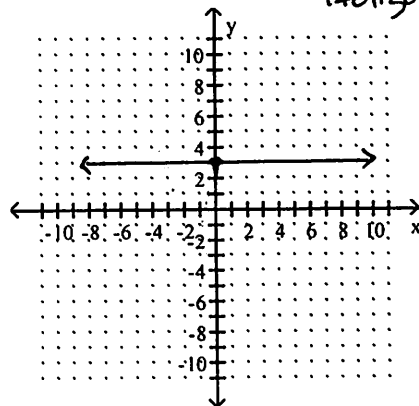
vertical line.



b.  $y - 3 = 0$

$$y = 3$$

horizontal line.



$$y - y_1 = m(x - x_1)$$

$$y + 9 = \frac{2}{9}(x - 3)$$

$$y + 9 = \frac{2}{9}x - \frac{2}{3}$$

$$y = \frac{2}{9}x - \frac{2}{3} - 9$$

$$y = \frac{2}{9}x - \frac{2}{3} - \frac{27}{3}$$

$$y = \frac{2}{9}x - \frac{29}{3}$$

Write an equation of the line containing the point (3, -9), and perpendicular to the line  $-2x - 9y = -87$ . Write the equation in slope-intercept form.

Line:  $m = \frac{2}{9}, (3, -9)$

$$m = -\frac{9}{2}$$

$$y = -\frac{9}{2}x + \frac{9}{2}$$

$$-9y = 2x - 87$$

$$-2x - 9y = -87$$

$$y = 1x + (-4) \Rightarrow y = x - 4$$

d. Write the equation of the line in slope-intercept form.

$$m = \frac{5}{4}$$

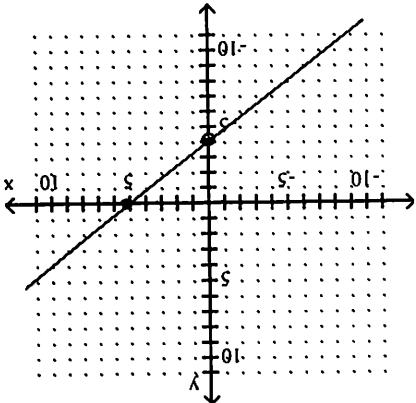
c. Find the slope of the line.

$$(5, 0)$$

b. Find the coordinates of x-intercept.

$$(0, -4)$$

a. Find the coordinates of the y-intercept.



(4) Given a graph.

11

(5) Equation of a line. Find an equation of the line having the slope  $m = -\frac{3}{4}$ , and containing the indicated point (7, -3). Write your answer in slope-intercept form.

$$y - y_1 = m(x - x_1)$$

$$y + 3 = -\frac{3}{4}(x - 7)$$

$$y + 3 = -\frac{3}{4}x + \frac{21}{4}$$

$$y = -\frac{3}{4}x + \frac{21}{4} - \frac{3}{4}$$

$$y = -\frac{3}{4}x + \frac{18}{4}$$

(6) Solve.

$$\begin{cases} \frac{1}{3}x - \frac{1}{4}y = 1 & (1) \\ \frac{3}{2}x + \frac{1}{2}y = 2 & (2) \end{cases} \times 6$$

$$\Rightarrow \begin{cases} 4x - 3y = 12 & (+) \\ 4x + 3y = 12 & (-) \end{cases}$$

$$8x = 24$$

$$x = 3$$

$$4x + 3y = 12$$

$$4(3) + 3y = 12$$

$$3y = 0$$

$$y = 0$$

$$\{(3, 0)\}$$

(6) Find rate of change.

13) a. If a student drove 325 miles in 5 hours, find his average rate in miles per hour.

$$\begin{aligned} \text{Average Rate} &= \frac{325 \text{ miles}}{5 \text{ hours}} \\ &= 65 \text{ miles per hour} \end{aligned}$$

b. If it took Ethan 14 minutes to read 7 pages, find his average rate in minutes per page.

$$\begin{aligned} \text{Average rate} &= \frac{14 \text{ min.}}{7 \text{ page}} \\ &= 2 \text{ min/page.} \end{aligned}$$

c. If Allen made 8 scones using 28 tablespoons of butter, find his average rate in tablespoons of butter per scone.

$$\begin{aligned} \text{Average Rate} &= \frac{28 \text{ tbs.}}{8 \text{ scones}} \\ &= 3.5 \text{ tbs/scone.} \end{aligned}$$

14) (5) Equation of a line.

A line passing through (4, -4) and (9, -6). Find the equation of the line in slope intercept form.

$$m = \frac{-6 - (-4)}{9 - 4} = \frac{-2}{5}$$

$$y - y_1 = m(x - x_1)$$

$$y + 4 = \frac{-2}{5}(x - 4)$$

$$y + 4 = \frac{-2}{5}x + \frac{8}{5}$$

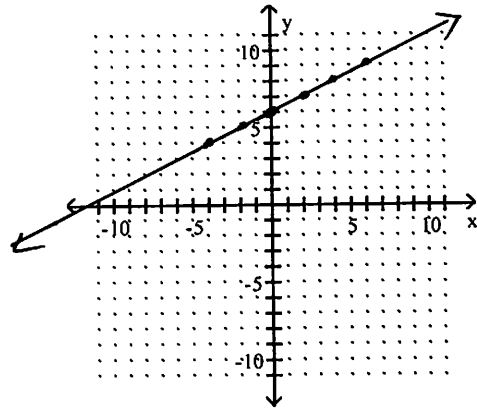
$$y = \frac{-2}{5}x + \frac{8}{5} - \frac{4 \cdot 5}{1 \cdot 5}$$

$$y = \frac{-2}{5}x + \frac{8}{5} - \frac{20}{5}$$

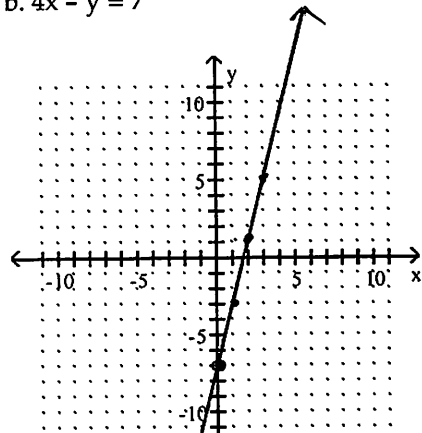
$$y = \frac{-2}{5}x - \frac{12}{5}$$

(6) Graph the linear equations.

15) a.  $y = \frac{1}{2}x + 6$ ,  $m = \frac{1}{2}$ ,  $(0, 6)$

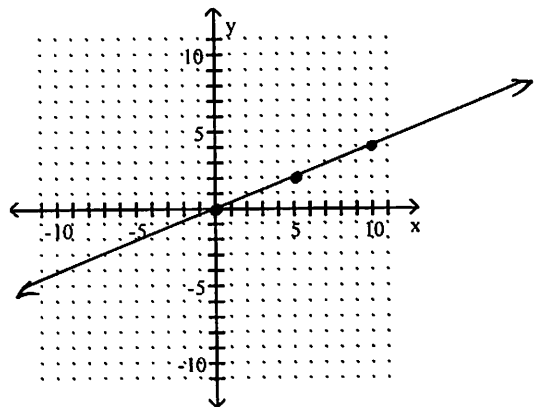


b.  $4x - y = 7$



$$\begin{aligned} 4x - y &= 7 \\ -y &= -4x + 7 \\ y &= 4x - 7 \end{aligned} \quad \begin{aligned} m &= \frac{4}{1} \\ (0, -7) \end{aligned}$$

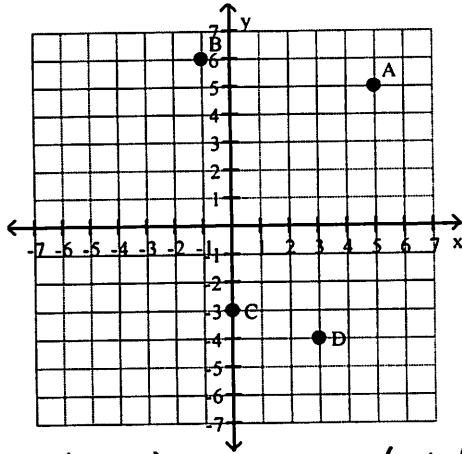
c.  $2x = 5y$



$$\begin{aligned} \frac{2x}{5} &= \frac{5y}{5} \\ y &= \frac{2}{5}x \end{aligned} \quad \begin{aligned} m &= \frac{2}{5}, (0, 0) \end{aligned}$$

(4) Find the coordinates of the labeled points.

16)



A:  $(5, 5)$

B:  $(-1, 6)$

C:  $(0, -3)$

D:  $(3, -4)$

18) Ron and Kathy are ticket sellers for their class play. Ron sells student tickets for \$2.00 each, and Kathy sells adult tickets for \$4.50 each. If their total revenue for 364 tickets is \$1175.50, then how many tickets did Ron sell?

	# of tickets	unit price	Total Value
(Ron) Student	$x$	2	$2x$
(Kathy) Adult	$y$	4.5	$4.5y$
total	364		1175.5

$$\begin{cases} x + y = 364 \\ 2x + 4.5y = 1175.5 \end{cases} \quad \times(-2)$$

$$\Rightarrow \begin{cases} -2x - 2y = -728 & (+) \\ 2x + 4.5y = 1175.5 \end{cases}$$

$$2.5y = 447.5$$

$$y = 179$$

$$x + 179 = 364$$

$$x = 185$$

Hence, Ron sold 185 tickets.

(6) Solve the problem.

17) How many liters of a 60%-alcohol solution must be mixed with 70 liters of a solution that is 90% alcohol to get a solution that is 80% alcohol?

	Vol	%	Pure Alcohol.
60% sol	$x$	0.6	$0.6x$
90% sol	70	0.9	$0.9(70)$
80% sol	$y$	0.8	$0.8y$

$$\begin{cases} x + 70 = y \\ 0.6x + 63 = 0.8y \end{cases}$$

$$\Rightarrow 0.6x + 63 = 0.8(x + 70)$$

$$0.6x + 63 = 0.8x + 56$$

$$0.6x - 0.8x = 56 - 63$$

$$-0.2x = -7$$

$$x = 35$$

So, 35 liters of 60% solution is needed.