#1-2:
a) Find the x-intercept
b) Find the y-intercept
c) Find an additional point
d) Sketch a graph

1) $2x + 4y = 12$

$$2x + 4(0) = 12$$
$$\frac{2x}{2} = \frac{12}{2}$$
$$x = 6$$

1a) *x − intercept* $(6, 0)$

1b) *y − intercept* $(0, 3)$

$$2(0) + 4y = 12$$
$$\frac{4y}{4} = \frac{12}{4}$$
$$y = 3$$

1c) *additional point* $(4, 1)$

let $y = 1$

(There are many
   wAys to get the
   3rd point)

(0,3)

(4,1)

(6,0)
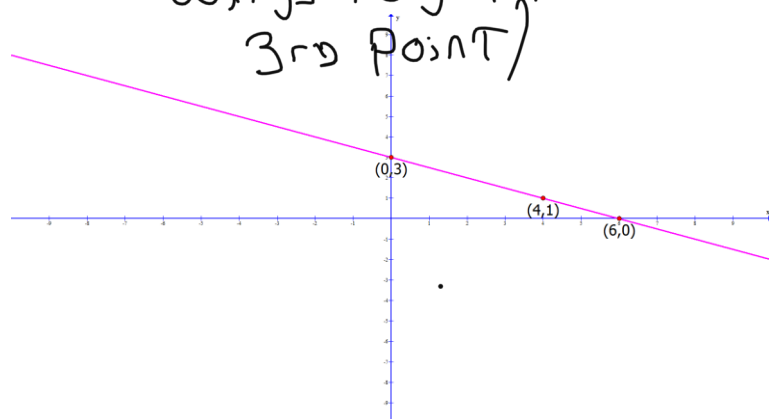
$$2x + 4(1) = 12$$
$$2x + 4 = 12$$
$$\underline{ - 4 - 4}$$
$$\frac{2x = 8}{}$$
$$x = 4$$

$(4, 1)$

↗ your point
   may be
      different

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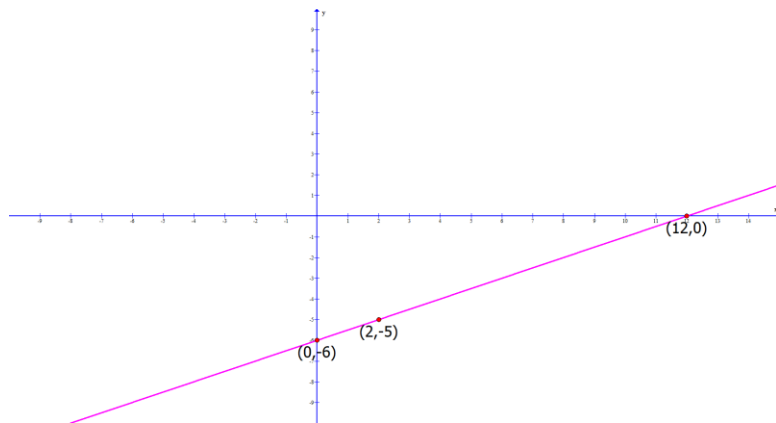
2) $y = \frac{1}{2}x - 6$

2a) $x - intercept\ (12, 0)$

$$0 = \frac{1}{2}x - 6$$
$$\underline{+6 \qquad\qquad +6}$$
$$\frac{2}{1} \cdot 6 = \frac{2}{1} \cdot \frac{1}{2}x$$
$$12 = x$$

2b) $y - intercept\ (0, -6)$

$$y = \frac{1}{2}(0) - 6$$
$$y = 0 - 6$$
$$y = -6$$

2c) $additional\ point\ (2, -5)$

let $x = 2$
$$y = \frac{1}{2}(2) - 6$$
$$y = 1 - 6$$
$$y = -5$$
$$(2, -5)$$

(12,0)

(2,-5)

(0,-6)

#3 – 4

a) Find three points

b) Plot the points

c) Sketch a graph.

d) Use the graph to find the x-intercept (say there is no x-intercept if the graph does not cross the x-axis).

e) Use the graph to find the y-intercept (say there is no y-intercept if the graph does not cross the y-axis.)
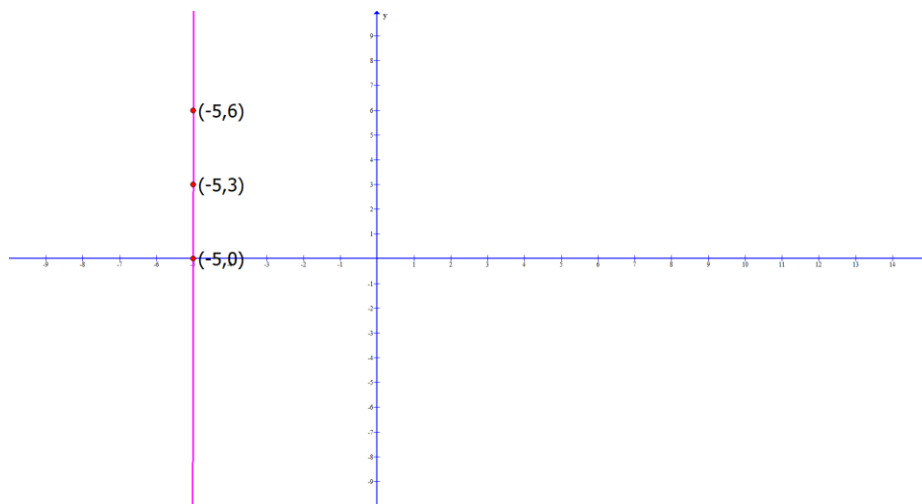
3) $x = -5$

3a) Any 3 points with $x = -5$ will work. You may have different points.

$(-5, 0), (-5, 3), (-5, 6)$

3b) and 3c) **See below**

3d) graph crosses x-axis at (5,0) $x - intercept\ (5, 0)$

3e) graph does not cross y-axis *no y-intercept*

#3 – 4

a) Find three points

b) Plot the points

c) Sketch a graph.

d) Use the graph to find the x-intercept (say there is no x-intercept if the graph does not cross the x-axis).

e) Use the graph to find the y-intercept (say there is no y-intercept if the graph does not cross the y-axis.)
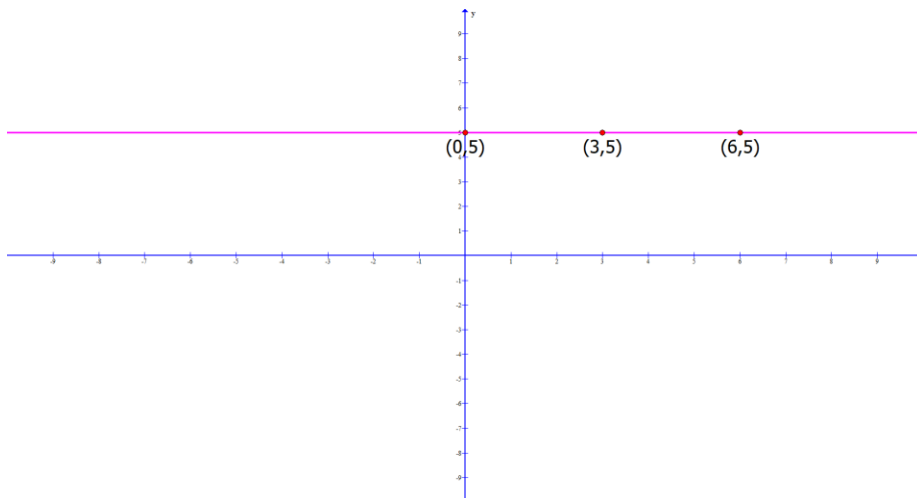
4) $y + 3 = 8$

4a) **Any 3 points with $y = 5$ will work. You may have different points.**
$(0, 5), (3, 5), (6, 5)$
4b) and 4c) **see graph below**

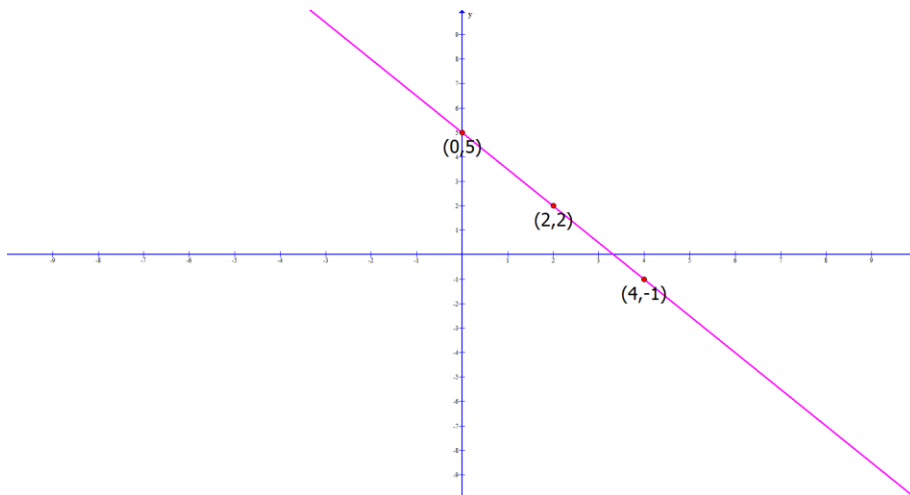4d) no x-Intercept, graph does NOT
cross x-axis

4e) (0,5)

5) Sketch the graph of the line. State the value of the slope and of the y-intercept, state if there is no y-intercept.

$$y = \frac{-3}{2}x + 5$$

Slope ↑ ↑ y-coordinate of y-intercept

Plot (0, 5)
go down 3
Right 2

y − intercept (0, 5) slope m = −$\frac{3}{2}$

(0,5)
(2,2)
(4,-1)

#6 – 7: Find the slope of the line that passes through the two points.

6) $first\ point\ (1,5)\ second\ point\ (-3,9)$

$$M = \frac{9-5}{-3-1}$$

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

$$M = -1$$

$m = -1$

7) $first\ point\ (2,4)\ second\ point\ (2,5)$

$$M = \frac{5-4}{2-2}$$

$$M = \frac{1}{0}$$

0 in denominator

→ undefined

$m = undefined$

8) $y = \frac{-2}{7}x + 6$

a) Find the slope of the given line
equation is written in slope-intercept form. The number in front of the x is the slope.

$m = -\frac{2}{7}$

b) Find the slope of all lines parallel to the given line
All lines parallel to the given line will have the same slope as the given line.
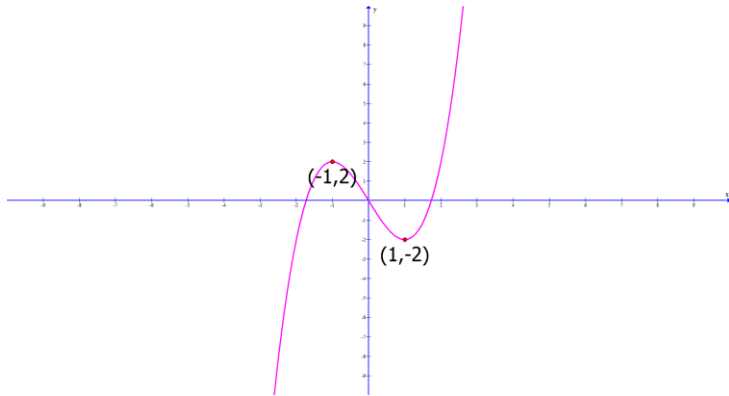
$m = -\frac{2}{7}$

c) Find the slope of all lines perpendicular to the given line.

All lines perpendicular to the given line will have a slope that is the negative reciprocal of the slope of the given line.

$m = \frac{7}{2}$

9) Use the graph of $f(x)$ to find the average rate of change from $x = -1$ to $x = 1$

(-1,2)

(1,-2)

find the points with the given x-values
Then find the slope of the line that connects the points

$$(-1,2) \quad (1,-2)$$

Average rate of change is -2

$$\text{Average rate of change} = \frac{-2-2}{1-(-1)}$$

$$= -\frac{4}{2}$$

$$= -2$$

10) Use the slope intercept formula to find the slope-intercept form of an equation of a line with $slope\ m$, passing through the $point\ (x, y)$. Write your answer in $slope-intercept$ form.

$m = 2\ point\ (5, -4)$

$$y = mx + b$$
$$-4 = 2(5) + b$$
$$-4 = 10 + b$$
$$\underline{-10 \quad -10}$$
$$-14 = b$$

$$M = 2$$

Answer:

$$y = 2x - 14$$

11) Use the point slope formula to find the equation of a line with slope m, passing through the point (x, y). Write your answer in slope-intercept form.

$m = -3$ $point$ $(1,5)$

$$y - 5 = -3(x-1)$$

$$y - 5 = -3x + 3$$

$$+5 \qquad\qquad +5$$

$$y = -3x + 8$$

Answer:

$y = -3x + 8$

12) Use the point slope formula to find the equation of a line passing through the points (x_1, y_1) and (x_2, y_2). Write your answer in slope-intercept form.

$(6, 8)$ and $(1, -2)$

$$M = \frac{-2-8}{1-6} = \frac{-10}{-5} = 2$$

$$x_1 = 6 \qquad y_1 = 8 \qquad M = 2$$

$$y - 8 = 2(x - 6)$$

$$y - 8 = 2x - 12$$

$$\underline{+8 \qquad\qquad +8}$$

$$y = 2x - 4$$

Answer:

$y = 2x - 4$

13) Find the equation of the vertical line passing through the point (x, y).

$point\ (2,9)$

All vertical lines have equations of the form $x = \#$

Just set x = to the x-coordinate of the given point

Answer: $x = 2$

14) Find the equation of the horizontal line passing through the point (x ,y).

$point\ (1, -3)$

All horizantal lines have equations of the form $y = \#$

Just set y = to the y-coordinate of the given point

Answer: $y = -3$

15) Etta Jane receives a weekly allowance of $8. She gets an additional $1 each day she cleans her bedroom.

a) Create an equation of a line that can be used to find the amount of money (M) Etta Jane receives in a week she cleans her bedroom (b) times.

$$M = 1b + 8 \quad or \quad M = b + 8$$

b) What will her allowance be in a week when she cleans her room 2 times?

$$M = 2 + 8 = 10$$

Her allowance will be $10.

#16-17: Solve each system of equations using the substitution method. If the system has no solutions say, that it is inconsistent. If the system is dependent write your answer in the form

$\{(x, y) | write\ either\ equation\}$

16) $x + 3y = 9$

$6x - 5y = 31$

Answer: $(6, 1)$

$x + 3y = 9$

$\underline{\quad -3y \quad -3y \quad}$

$x = -3y + 9$

$6(-3y + 9) - 5y = 31$

$-18y + 54 - 5y = 31$

$-23y + 54 = 31$

$\quad -54 - 54$

$\overline{\quad\quad\quad\quad\quad}$

$\dfrac{-23y}{-23} = \dfrac{-23}{-23}$

$y = 1$

$x = -3y + 9$

$x = -3(1) + 9$

$x = -3 + 9$

$x = 6$ $\quad (6, 1)$

#16-17: Solve each system of equations using the substitution method. If the system has no solutions say, that it is inconsistent. If the system is dependent write your answer in the form
$\{(x, y) | write\ either\ equation\}$

17)

$x = -3y + 12$

$4x + 12y = 48$

$4(-3y+12) + 12y = 48$

$-12y + 48 + 12y = 48$

$48 = 48$

Variables drop,

True statement

→ dependent

Answer:

dependent: $\{(x,y)|x = -3y + 12\}$ *or* $\{(x,y)|4x + 12y = 48\}$

#18 – 19: Solve each system of equations using the elimination method. If the system has no solutions say, that it is inconsistent. If the system is dependent write your answer in the form $\{(x, y)|write\ either\ equation\}$

18)

$2\left(\begin{array}{l} 2x + 3y = 13 \\ 3x - 6y = 9 \end{array}\right)$

$4x + 6y = 26$
$3x - 6y = 9$
$$\overline{7x = 35}$$
$$x = 5$$

$$2x + 3y = 13$$
$$2(5) + 3y = 13$$
$$10 + 3y = 13$$
$$\underline{-10 \qquad\quad -10}$$
$$3y = 3$$
$$y = 1$$
$$(5, 1)$$

Answer: $(5, 1)$

#18 – 19: Solve each system of equations using the elimination method. If the system has no solutions say, that it is inconsistent. If the system is dependent write your answer in the form $\{(x, y)|write\ either\ equation\}$

19)

$$-2\left(\begin{array}{l}4x + 2y = 16 \\ 8x + 4y = 36\end{array}\right) \longrightarrow$$

$$-8x - 4y = -32$$
$$\underline{8x + 4y = 36}$$
$$0 = 4$$

Variables cancel
& false statement
No Solution

Answer: No solution / inconsistent

20) Etta has quarters and dimes. She has a total of 15 coins and the value of the coins is $3.00. How many of each type of coin does she have?

$$Q = \text{\# Quarters}$$
$$d = \text{\# dimes}$$

$$Q + d = 15$$
$$.25Q + .10d = 3$$

$$Q + d = 15$$
$$\underline{-Q \quad -Q}$$
$$d = -Q + 15$$

$$.25Q + .10(-Q + 15) = 3$$
$$.25Q - .10Q + 1.5 = 3$$
$$.15Q + 1.5 = 3$$
$$\underline{\quad -1.5 - 1.5}$$
$$\frac{.15Q}{.15} = \frac{1.5}{.15}$$
$$Q = 10$$

$$Q + d = 15$$
$$10 + d = 15$$
$$d = 5$$

Answer: Etta has 10 quarters and 5 dimes.

$X = \#\ gallons\ 50\%.$

$Y = \#\ gallons\ 20\%.$

21) Kristin wants to make 60 gal. of a 40% alcohol solution by mixing a 20% alcohol solution and a 50% alcohol solution. How much of each solution must she use

Concentration	50%	20%	40% (result)
Amount	X	Y	60
Multiply	$.50X$	$.20Y$	$.40(60) = 24$

$$-.20(X + Y = 60) \rightarrow \begin{array}{r} -.20X - .20Y = -12 \\ .50X + .20Y = 24 \\ \hline \end{array}$$

$$.50X + .20Y = 24$$

$$\frac{.30X}{.30} = \frac{12}{.30}$$

$$X = 40$$

$$X + Y = 60$$

$$40 + Y = 60$$

$$Y = 20$$

Answer: 40 gallons of 50% solution, 20 gallons of 20% solution.