

Review for Test #2:

- 1) Find the slope of the line passing through the points $(4,3)$ and $(-5,-2)$.

$$m = \frac{-2-3}{-5-4} = \frac{-5}{-9} = \boxed{\frac{5}{9}}$$

- 2) Find the equation of the line that has a slope of 6 and passes through the point $(-3,5)$.

$$y = mx + b$$

$$5 = 6(-3) + b$$

$$5 = -9 + b$$

$$5 + 9 = -9 + b + 9$$

$$14 = b$$

$$y = 6x + 14$$

- 3) Find the equation of the line that passes through the points $(3,4)$ and $(-4,6)$.

$$m = \frac{6-4}{-4-3} = \frac{2}{-7} = -\frac{2}{7}$$

$$y = mx + b$$

$$4 = -\frac{2}{7}(3) + b$$

$$4 = -\frac{6}{7} + b$$

$$4 + \frac{6}{7} = -\frac{6}{7} + b + \frac{6}{7}$$

$$\frac{28}{7} + \frac{6}{7} = b$$

$$\frac{34}{7} = b$$

$$y = -\frac{2}{7}x + \frac{34}{7}$$

- 4) What is the slope of the line $3x + 2y = 12$?

$$\frac{3x + 2y = 12}{-3x} \quad \frac{-3x}{-3x} \quad \frac{-3x}{-3x}$$

$$2y = -3x + 12$$

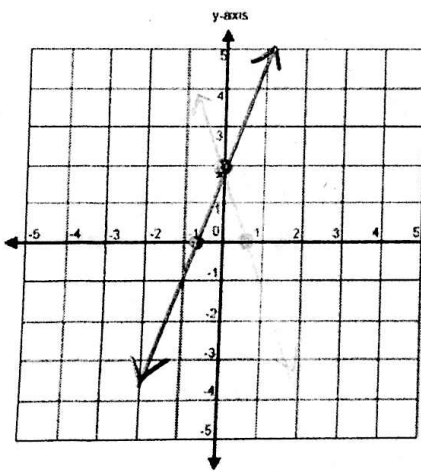
$$\frac{2y}{2} = \frac{-3x + 12}{2}$$

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

$$m = -\frac{3}{2}$$

- 5) Graph $2y = 6x + 4$ using

- X & Y intercepts
- Creating a table



(a) x-int

$$2y = 6x + 4$$

$$2(0) = 6x + 4$$

$$0 = 6x + 4$$

$$-4 = 6x + 4 - 4$$

$$-4 = 6x$$

$$\frac{-4}{6} = \frac{6x}{6}$$

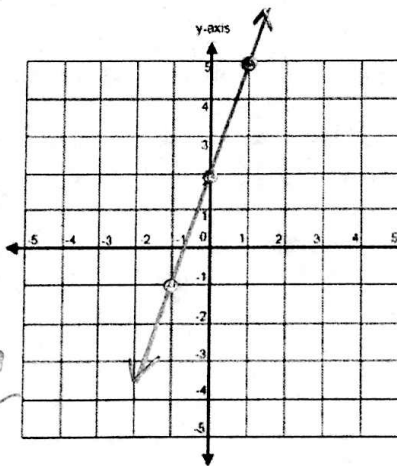
$$x = -\frac{2}{3} \approx -0.67$$

y-int

$$2y = 6(0) + 4$$

$$2y = 0 + 4$$

$$\frac{2y}{2} = \frac{4}{2} \quad y = 2$$



(b) $\frac{2y}{2} = \frac{6x + 4}{2}$

$$y = 3x + 2$$

x	3x+2	y	(x,y)
-1	3(-1)+2	-1	(-1,-1)
0	3(0)+2	2	(0,2)
1	3(1)+2	5	(1,5)
2	3(2)+2	8	(2,8)

- 6) Daniel sells magazine subscriptions and earns \$4 for every new subscriber he signs up. Daniel also earns a \$38 weekly bonus regardless of how many magazine subscriptions he sells.

- c. Write a linear equation to represent this scenario

$$y = 4x + 38$$

- b. If Daniel wants to earn at least \$91 this week, how many subscriptions does he need to sell?

$$91 = 4x + 38$$

$$-38 \quad -38$$

$$53 = 4x$$

$$\frac{53}{4} = \frac{4x}{4}$$

$$x = 13.25$$

he needs to sell 14 subscrip

7) Based on the table below, what was the rate of change in the population of Sun City during the years 1980-1985?

(x)	(y)
Year	Population
1980 x_1	20,000 y_1
1985 x_2	16,500 y_2
1990	13,000
1995	9,500

$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{16,500 - 20,000}{1985 - 1980} = \frac{-3500}{5} = \boxed{-700}$$

The population of Sun City is decreasing by 700 people per year

8) Jade earned \$250 last week for selling magazine subscriptions to 8 people. This week she earned \$325 for selling magazine subscriptions to 11 people.

a) Write an equation to represent how much Jade makes for selling magazines subscriptions to x number of people.

$$m = \frac{325 - 250}{11 - 8} = \frac{75}{3} = 25$$

$$y = mx + b$$

$$250 = 25(8) + b$$

$$250 = 200 + b$$

$$-200 \quad -200$$

$$b = 50$$

$$y = \$25x + \$50$$

b) How much does she make per each magazine subscription?

$$\boxed{\$25}$$

c) How much is her base pay?

$$\boxed{\$50}$$

d) How much would she make if she doesn't sell any magazine subscriptions?

$$\boxed{\$50} \quad y = 25(0) + 50 \quad y = 0 + 50 = 50$$

e) How much would she make if she sold magazine subscriptions to 16 people?

$$y = 25(16) + 50$$

$$= 400 + 50$$

$$= 450 \quad \boxed{\$450}$$

f) She needs to make at least \$500 next week. How many people would she need to sell magazine subscriptions to in order to reach this goal?

$$500 = 25x + 50$$

$$\underline{-50} \quad \underline{-50}$$

$$450 = 25x$$

$$\frac{450}{25} = \frac{25x}{25}$$

$$18 = x$$

$$\boxed{18 \text{ people}}$$

9) Which equation has a graph that is parallel to the graph of $-6x + 4y = -6$?

a. $-2x + 3y = 6$

~~b. $2x - 3y = -6$~~

$$\frac{-6x + 4y = -6}{+6x} \quad \frac{-6}{+6x}$$

c. $-3x + 2y = 6$

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

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

~~c. $-2x - 3y = -16$~~

$$y = \left(\frac{3}{2}\right)x + 3$$

* parallel same slope

$$\frac{4y}{4} = \frac{6x - 6}{4}$$

$$y = \left(\frac{3}{2}\right)x - \frac{3}{2}$$

* negative reciprocal slope $\perp m = \frac{4}{3}$

10) Which equation has a graph that is perpendicular to the graph of $3x + 4y = 2$?

~~a) $3x - 4y = 1$~~

c) $4x - 3y = 0$

~~b) $4x + 3y = -2$~~

~~d) $4y + 3x = 3$~~

$$\begin{aligned} 3x + 4y &= 2 \\ -3x & \quad -3x \\ \hline 4y &= -3x + 2 \\ \frac{4y}{4} &= \frac{-3x + 2}{4} \\ y &= \left(-\frac{3}{4}\right)x + \frac{1}{2} \end{aligned}$$

$$\begin{aligned} 4x - 3y &= 0 \\ -4x & \quad -4x \\ \hline -3y &= -4x + 0 \\ \frac{-3y}{-3} &= \frac{-4x + 0}{-3} \\ y &= \left(\frac{4}{3}\right)x + 0 \end{aligned}$$

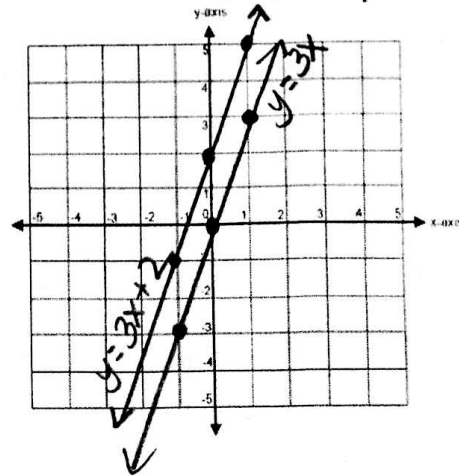
11) Write an equation of a line that goes through the points (1, 3) and is parallel to the equation $y = 3x + 2$.

$m = 3$

$$\begin{aligned} y &= mx + b \\ 3 &= 3(1) + b \\ 3 &= 3 + b \\ -3 \quad -3 \\ \hline 0 &= b \end{aligned}$$

$$y = 3x + 0$$

$y = 3x$

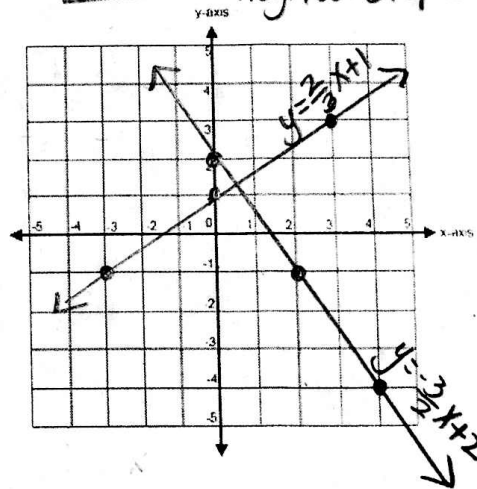


12) Write an equation of a line that goes through the points (4, -4) and is perpendicular to the line $y = \frac{2}{3}x + 1$.

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

$$\begin{aligned} y &= mx + b \\ -4 &= -\frac{3}{2}(4) + b \\ -4 &= -\frac{12}{2} + b \\ -4 &= -6 + b \\ +6 \quad +6 \\ \hline 2 &= b \end{aligned}$$

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



13) The line segment PQ is perpendicular to the line segment RS. If the coordinates are P(3, -2), Q(1, 4), R(7, y), and S(1, -3), find the value of y.

$$m_{\overline{PQ}} = \frac{4 - (-2)}{1 - 3} = \frac{6}{-2} = -3$$

$$\perp m_{\overline{RS}} = \frac{1}{3}$$

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ \frac{1}{3} &= \frac{-3 - y}{1 - 7} \end{aligned}$$

$$\begin{aligned} \frac{1}{3} &= \frac{-3 - y}{-6} \\ -6 &= 3(-3 - y) \\ -6 &= -9 - 3y \\ +9 \quad +9 \\ \hline 3 &= -3y \\ \frac{3}{-3} &= \frac{-3y}{-3} \end{aligned}$$

$y = -1$

same slope

14) The line segment AB is parallel to the line segment CD. If the coordinates are A(6, -2), B(5, 3), C(1, -4), and D(-1, y), find the value of y.

$$m_{\overline{AB}} = \frac{3 - (-2)}{5 - 6} = \frac{5}{-1} = -5$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$-5 = \frac{y - 4}{-1 - 1}$$

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

$$\frac{-10 = y + 4}{-4}$$

$$\boxed{4 = y}$$

15) Write an equation of a line that passes through (-4, 2) and is parallel to a line that passes through (6, 1) and (4, 0). Graph and label both equations.

$$m = \frac{0 - 1}{4 - 6} = \frac{-1}{-2} = \frac{1}{2}$$

$$y = mx + b$$

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

$$1 = 3 + b$$

$$\frac{-3}{-3} \quad \frac{-3}{-3}$$

$$-2 = b$$

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

$$m = \frac{1}{2} \text{ (same slope)}$$

$$y = mx + b$$

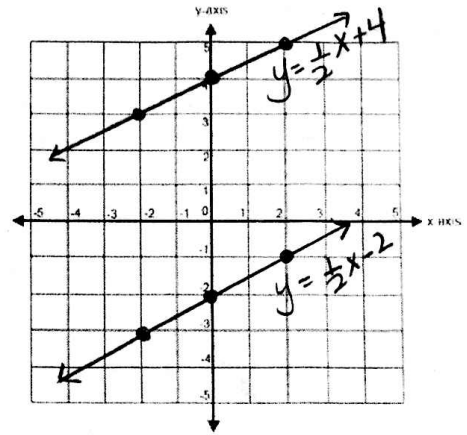
$$2 = \frac{1}{2}(-4) + b$$

$$2 = -2 + b$$

$$\frac{+2}{+2} \quad \frac{+2}{+2}$$

$$4 = b$$

$$\boxed{y = \frac{1}{2}x + 4}$$



16) Write an equation of a line that passes through (15, -7) and is perpendicular to a line that passes through (9, 14) and (-6, -11). Graph and label both equations.

$$m = \frac{-11 - 14}{-6 - 9} = \frac{-25}{-15} = \frac{5}{3}$$

$$y = mx + b$$

$$14 = \frac{5}{3}(9) + b$$

$$\frac{-14}{-15} \quad \frac{-14}{-15}$$

$$-1 = b$$

$$\boxed{y = \frac{5}{3}x - 1}$$

$$m = -\frac{3}{5}$$

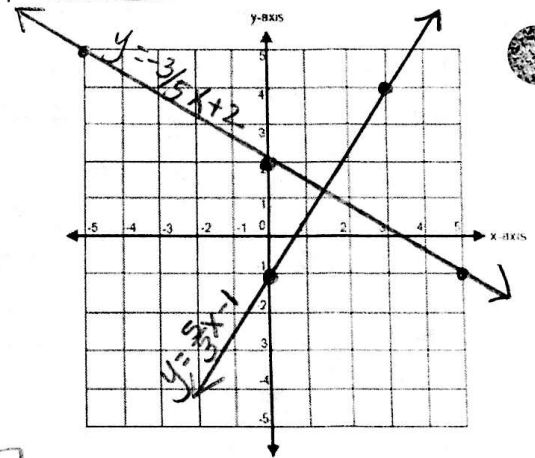
$$y = mx + b$$

$$-7 = -\frac{3}{5}(15) + b$$

$$\frac{-7}{+9} \quad \frac{-7}{+9}$$

$$2 = b$$

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



17) Given points W(4, 2), X(-1, 1), Y(1, 6), and Z(-5, -2), which statement is true?

a) $\overline{XZ} \parallel \overline{WY}$ $m_{\overline{WX}} = \frac{1 - 2}{-1 - 4} = \frac{-1}{-5} = \frac{1}{5}$ b) $\overline{WX} \perp \overline{YZ}$ $m_{\overline{XZ}} = \frac{-2 - 1}{-5 - 1} = \frac{-3}{-4} = \frac{3}{4}$

c) $\overline{WX} \parallel \overline{YZ}$ $m_{\overline{YZ}} = \frac{-2 - 6}{-5 - 1} = \frac{-8}{-6} = \frac{4}{3}$ d) $\overline{XZ} \perp \overline{WY}$ $m_{\overline{WY}} = \frac{6 - 2}{1 - 4} = \frac{4}{-3}$

$m_{\overline{WZ}} = \frac{-2 - 2}{-5 - 4} = \frac{-4}{-9} = \frac{4}{9}$ $m_{\overline{YZ}} =$

* // means parallel \perp means perpendicular