

**MAC 1105 COLLEGE ALGEBRA
TEST 1**

Name KEY

Score 47

Directions: Answer each question showing ALL work for full credit.

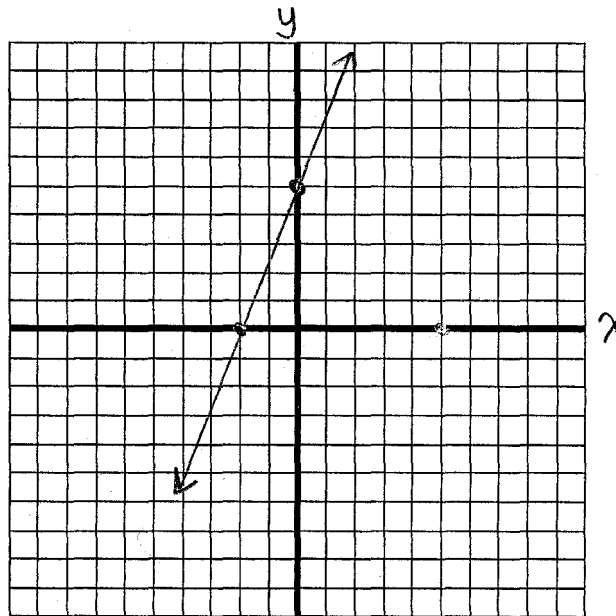
1. Determine the x -intercept for the graph of the line with equation $2y - 5x = 10$. (1 point)

Set $y=0$ obtain $-5x=10$
 $x=-2$ so $(-2,0)$ is the x -int.

Determine the y -intercept for the graph of the line with equation $2y - 5x = 10$. (1 point)

Set $x=0$ obtain $2y=10$
 $y=5$ so $(0,5)$ is the y -int.

Make a graph of the line $2y - 5x = 10$ on the grid below using a straight edge. Be sure to label the axes and show a scale i.e. x - scl: 1 and y - scl: 1 (3 points)



The slope of this line is $m = \frac{5}{2}$. (1 point)

Find the vertical change (Δy) associated with the horizontal change $\Delta x = 12$. (1 point)

$$\frac{5}{2} = \frac{\Delta y}{12} \Rightarrow \Delta y = 30$$

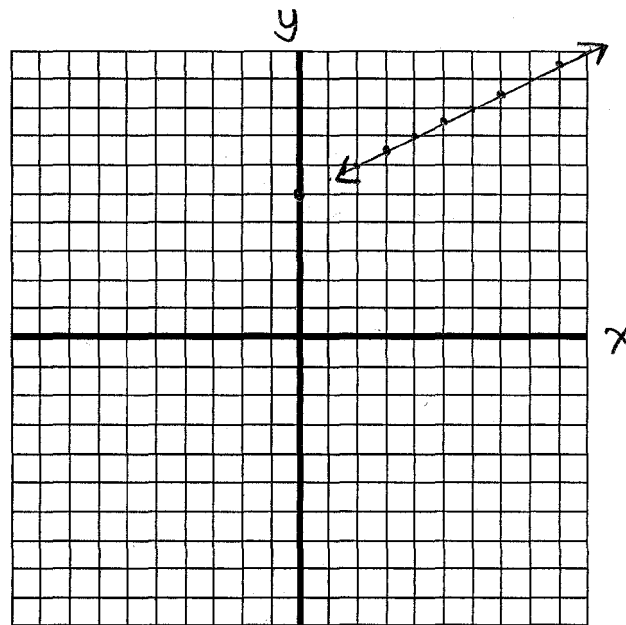
Find the horizontal change (Δx) associated with the vertical change $\Delta y = 0.8$. (1 point)

$$\frac{5}{2} = \frac{0.8}{\Delta x} \Rightarrow \Delta x = 0.32$$

2. In England, oven cooking temperatures are often given as Gas Marks rather than degrees Fahrenheit. The table shows the equivalent oven temperature for various Gas Marks.

Gas Mark	3	5	7	9
Degrees (F)	325	375	425	475

Letting x = the Gas Mark and y = degrees Fahrenheit, plot the data on the graph provided and draw a straight line connecting the points. Use x scale = 1 and y scale = 50. Be very accurate with your graph. Label your axes. You may use a straight edge. (4 points)



Every unit increase in the Gas Mark corresponds to an increase of 25 °F.
(1 point)

Pick any point in the table and use it to find a linear equation that gives the temperature (°F) in terms of the Gas Mark. Write your answer in $y = mx + b$ form. (2 points)

$$m = 25 \quad y - 325 = 25(x - 3)$$

$$y = 25x + 250$$

Using your equation, determine how many degrees Fahrenheit corresponds to a Gas Mark of zero? (1 point)

$$250^\circ \text{ F}$$

3. You are given the function $f(x) = 2x^2 - 5x$. Evaluate the following AND simplify.

- $f(3p)$ (2 points)

$$= 2(3p)^2 - 5(3p)$$

$$= 2(9p^2) - 15p$$

$$= \boxed{18p^2 - 15p}$$

- $f(p+3)$ (2 points)

$$= 2(p+3)^2 - 5(p+3)$$

$$= 2(p^2 + 6p + 9) - 5p - 15$$

$$= 2p^2 + 12p + 18 - 5p - 15$$

$$= \boxed{2p^2 + 7p + 3}$$

- $3f(p) - 5$ (2 points)

$$= 3(2p^2 - 5p) - 5$$

$$= \boxed{6p^2 - 15p - 5}$$

4. The table below gives the coordinates of points on a line. Fill in the missing table entries. Be sure to show the steps on how you arrived at your answers. (6 points)

x	y	
-10	800	
2)	-2	608
	5	440
1)	8	368
	16	176

$$m = \frac{440 - 176}{5 - 16} = -24$$

$$y = mx + b \quad \text{pick the pt. } (5, 440)$$

$$440 = -24(5) + b$$

$$b = 560$$

$$\begin{aligned} 1) \quad 368 &= -24x + 560 \\ \Rightarrow x &= 8 \end{aligned}$$

$$y = -24x + 560$$

$$\begin{aligned} 2) \quad y &= -24(-2) + 560 \\ \Rightarrow y &= 608 \end{aligned}$$

5. Flying lessons cost \$645 for an 8-hour course and \$1425 for a 20-hour course. Both prices include a fixed insurance fee.

Let y represent the cost of flying lessons in dollars.

Let x represent the length of the course in hours.

Express the cost of flying lessons in terms of the length of the course in hours. This means to find an equation in the form $y = mx + b$. (4 points)

$$\begin{array}{l} (8, 645) \\ (20, 1425) \end{array} \quad m = \frac{1425 - 645}{20 - 8} = 65$$

$$\begin{array}{l} y = 65x + b \\ 645 = 65(8) + b \\ b = 125 \end{array} \quad \text{so } \boxed{y = 65x + 125}$$

How much is the fixed insurance fee? (1 point)

\$125 (the y-int)

6. The admission to a local baseball game was \$7.50 for adults and \$4.25 for students. The ticket office took in \$465.50 for 82 paid admissions.

	Number of tickets	Cost per ticket	Revenue
Adults	x	\$7.50	$7.5x$
Students	y	\$4.25	$4.25y$
Total	82	—	\$465.50

Use the table to write an equation for the number of tickets sold. (1 point)

$$x + y = 82$$

Use the table to write another equation for the revenue from the tickets. (1 point)

$$7.5x + 4.25y = 465.50$$

Solve the system of equations that you wrote above. (4 points)

"Eliminate x "

$$-7.5x - 7.5y = -615$$

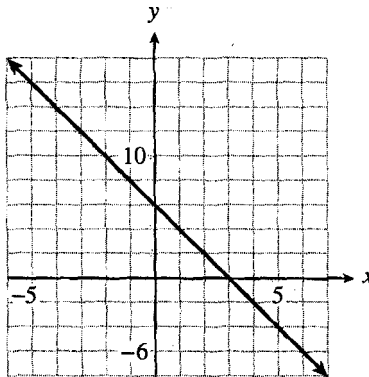
$$7.5x + 4.25y = 465.50$$

$$-3.25y = -149.5$$

$$y = 46 \text{ students}$$

$$x = 82 - y = 36 \text{ adults}$$

7. Below is the graph of a linear function $y = f(x)$. Make note of the X scl and Y scl.



The slope of the line is $m = \underline{-2}$. (2 points)

The x -intercept is $(\underline{3}, \underline{0})$. The y -intercept is $(\underline{0}, \underline{6})$. (2 points)

Write the equation for this line in $y = mx + b$ form. (2 points)

$$y = -2x + 6$$

Use your equation to determine $f(\frac{3}{5})$. Express your answer as a fraction. (1 point)

$$-2\left(\frac{3}{5}\right) + 6 = \left(\frac{24}{5}\right)$$

Find the value of x so that $f(x) = -4$. (1 point)

$$\text{solve: } -2x + 6 = -4$$

$$x = 5$$