

Math 100 Exam 2, Chapters 3 and 4, KIRKBRIDE, MTWTh, 8:15-9:20am

Name: Key

Student ID: \_\_\_\_\_

Instructions: Show your work and circle your answers

1. Which of the following are solutions to the equation  $y = -\frac{4}{3}x + 2$ ? (6 points)

a)  $(-3, 6)$

$$\begin{aligned} 6 &= -\frac{4}{3}(-3) + 2 \\ 6 &= 12/3 + 2 \\ 6 &= 4 + 2 \\ 6 &= 6 \checkmark \end{aligned}$$

b)  $(\frac{3}{4}, 0)$

$$\begin{aligned} 0 &= -\frac{4}{3}(\frac{3}{4}) + 2 \\ 0 &= -1 + 2 \\ 0 &\neq 1 \end{aligned}$$

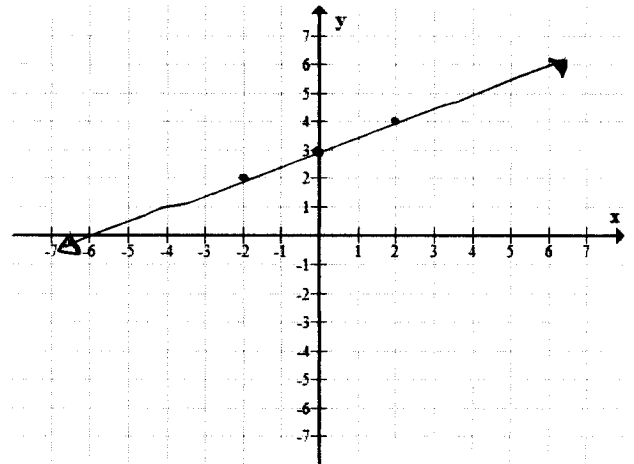
c)  $(1, \frac{3}{2})$

$$\begin{aligned} \frac{3}{2} &= -\frac{4}{3}(1) + 2 \\ \frac{3}{2} &= -\frac{4}{3} + \frac{6}{3} \\ \frac{3}{2} &\neq \frac{2}{3} \end{aligned}$$

2. Complete the table. Plot the resulting data and draw a line through the plotted points. (7 points)

Table: 5 points Graph: 2 points

x	-4	-2	0	2	4
$y = \frac{1}{2}x + 3$	1	2	3	4	5



3. Sketch the graph of the line  $2x + 3y = -6$  using intercepts. Be sure to label the x-intercept and y-intercept.

Show work for credit (7 points).

y-intercept  $x=0$

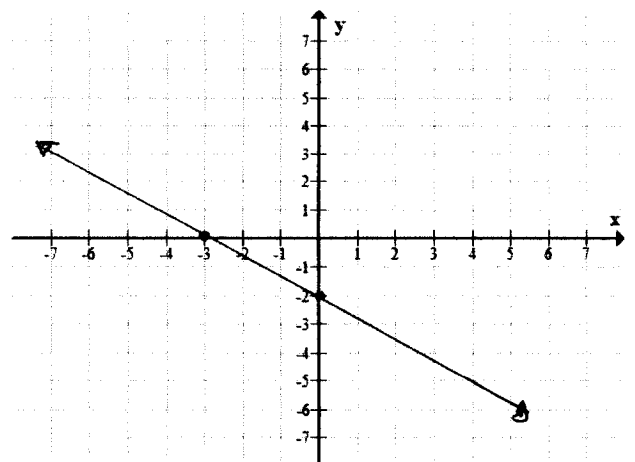
$$\begin{aligned} 2(0) + 3y &= -6 \\ 3y &= -6 \\ y &= -2 \end{aligned}$$

$(0, -2)$

x-intercept  $y=0$

$$\begin{aligned} 2x + 3(0) &= -6 \\ 2x &= -6 \\ x &= -3 \end{aligned}$$

$(-3, 0)$

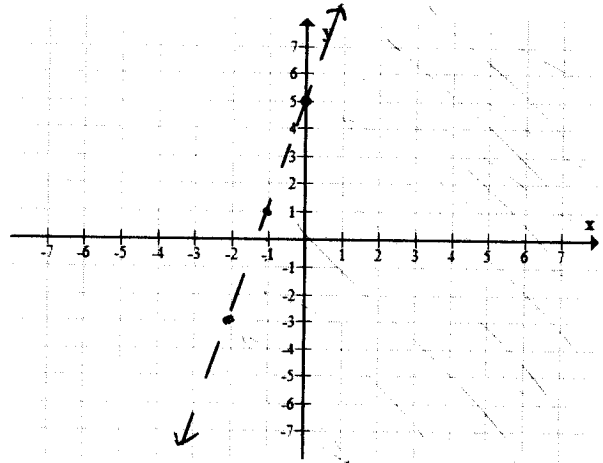


8. Sketch the linear inequality  $-4x + y < 5$ . (8 points)

$$y < 4x + 5$$

Test (0,0)

$$0 < 5 \checkmark$$



9. Solve the system of equations  $\begin{cases} x + y = 1 \\ x - 2y = 4 \end{cases}$  by the Graphing Method. (7 points)

$$y = -x + 1$$

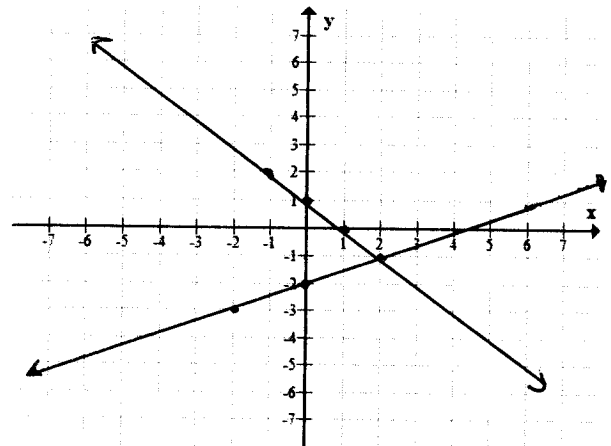
$$\frac{-2y}{-2} = \frac{-x+4}{-2} \quad \frac{-2}{-2}$$

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

$$(2, -1)$$

$$2 + (-1) = 1 \\ 1 = 1 \checkmark$$

$$2 - (2)(-1) = 4 \\ 4 = 4 \checkmark$$



10. Solve the system of equations  $\begin{cases} 4x + y = 7 \\ x - 3y = 5 \end{cases}$  by the following methods: (7 points each)

a) Elimination Method

$$\textcircled{1} \quad 4x + y = 7$$

$$\textcircled{2} \quad x - 3y = 5$$

$$+ \textcircled{1} \quad 12x + 3y = 21$$

$$\hline 13x = 26$$

$$x = 2$$

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

$$8 + y = 7$$

$$y = -1$$

Solution: (2, -1)

b) Substitution

$$x = 3y + 5$$

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

$$x = -3 + 5$$

$$x = 2$$

Solution: (2, -1)

$$4(3y + 5) + y = 7$$

$$12y + 20 + y = 7$$

$$13y + 20 = 7$$

$$13y = -13$$

$$y = -1$$

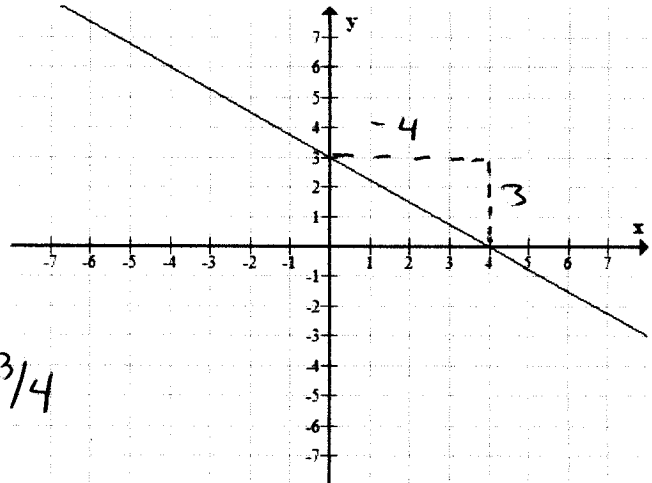
4. Determine the slope of each line (4 points each).

a) Through  $(-3, 2)$  and  $(-1, 4)$

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

$$m = 1$$

b)



$$m = -3/4$$

5. Find the slope and the coordinates of the y-intercept for the line. Then graph the line. (7 points)

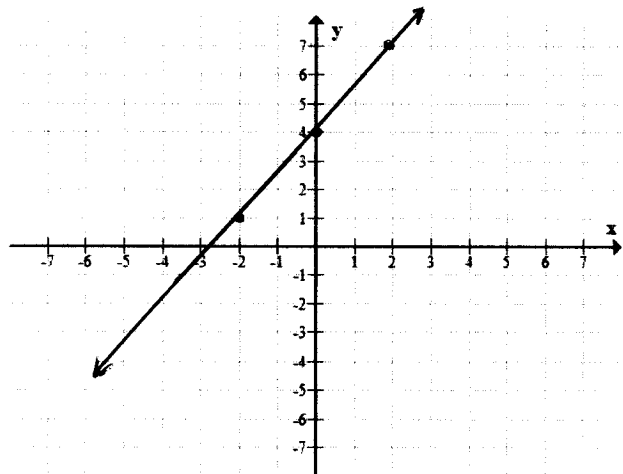
$$-3x + 2y = 8$$

$$2y = 3x + 8$$

$$y = 3/2 x + 4$$

$$\text{slope} = 3/2$$

$$\text{y-intercept } (0, 4)$$



6. Write the equation of a line going through  $(-4, 1)$  that is parallel to the line  $y = 4x - 3$ . (7 points)

$$m = 4$$

$$y - 1 = 4(x - (-4))$$

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

$$y - 1 = 4x + 16$$

$$y = 4x + 17$$

7. Write an equation of a line going through the points  $(3, -1)$  and  $(1, 5)$ . (7 points)

$$\text{slope} = \frac{5-(-1)}{1-3} = \frac{5+1}{-2} = \frac{6}{-2} = -3$$

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

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

$$y = -3x + 8$$

11. The total cost of 2 jackets and 3 shirts is \$225. The cost of a jacket is three times the cost of a shirt. Set up a system of equations and solve to find the cost of a jacket and the cost of a shirt. (7 points, SHOW WORK)

$$2j + 3s = 225$$

$$j = 3s$$

$$2(3s) + 3s = 225$$

$$6s + 3s = 225$$

$$\frac{9s}{9} = \frac{225}{9}$$

$$s = 25$$

$$j = 3(25) = 75$$

$j$  = cost of jacket  
 $s$  = cost of shirt

Solution: A shirt costs \$25  
 A jacket costs \$75

12. One pan pizza and two beef burritos provide 1980 calories. Two pan pizzas and one beef burrito provide 2670 calories. Find the caloric content of each item. (7 points)

$$x + 2y = 1980 \Rightarrow x = 1980 - 2y$$

$$2x + y = 2670$$

$$2(1980 - 2y) + y = 2670$$

$$3960 - 4y + y = 2670$$

$$-3y = 1290$$

$$y = 430$$

$$2x + 430 = 2670$$

$$2x = 2240$$

$$x = 1120$$

There are 1120 calories in a pan pizza  
 and 430 calories in a beef burrito

12. Graph the solution set of the system of linear inequalities

$$x + y \leq 2$$

$$x - y \geq 3$$

(8 points)

①  $y = -x + 2$

$-y = -x + 3$

②  $y = x - 3$

check

Let  $x=0, y=0$

①  $0 \leq 2 \checkmark$

②  $0 \geq 3$

check a point

$(3, -3) \quad 3 + (-3) \leq 2$

$1 \leq 2 \checkmark$

$3 - (-3) \geq 3$

$6 \geq 3 \checkmark$

