

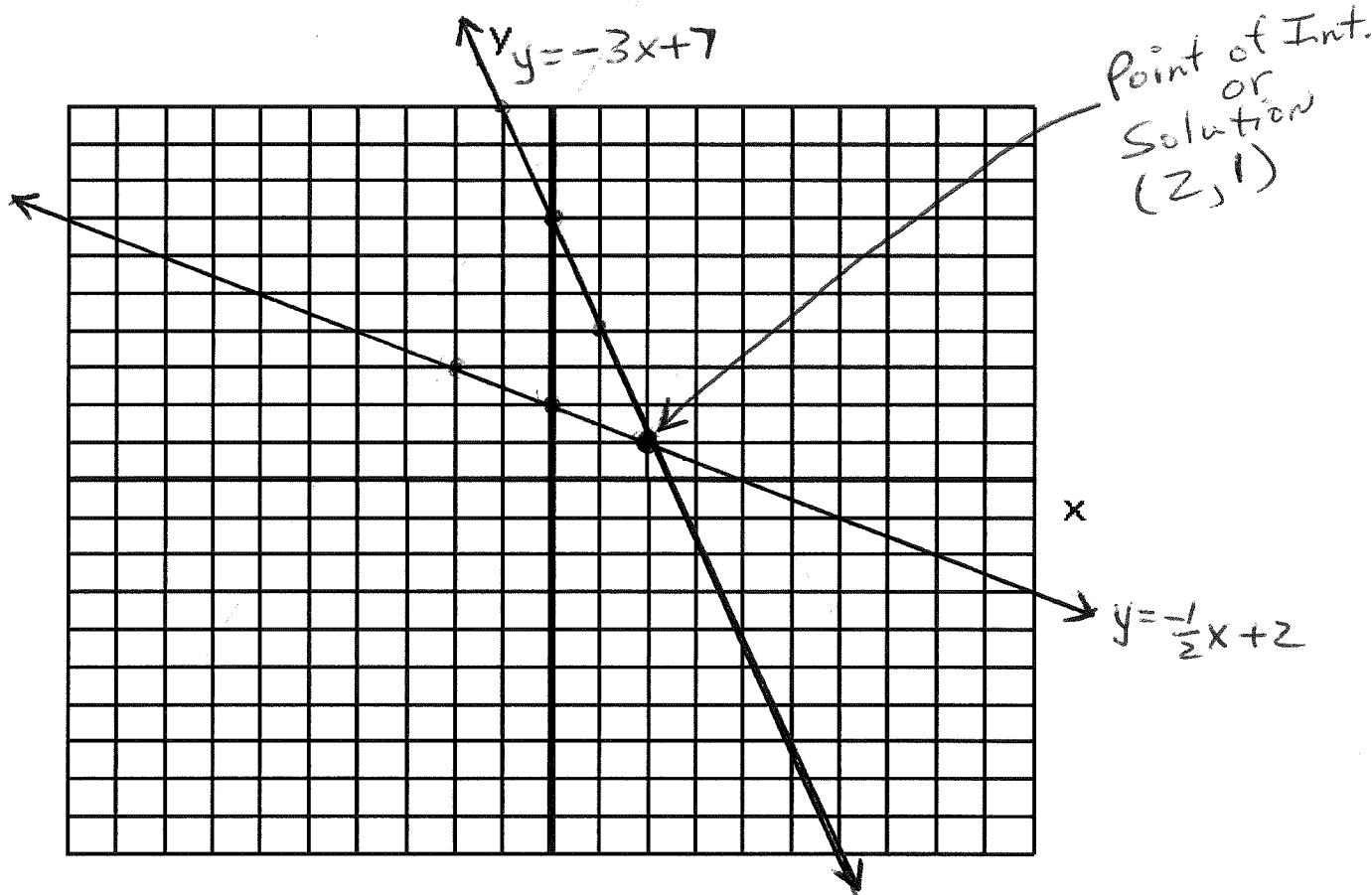
Full Name: Answer Key TA#: _____ Date: _____

Math 10 F LG 12 Ver. B

Total Marks _____ / 25
_____ %

Expectation #1: Solve systems of linear equations graphically.

1. Determine the point of intersection of the lines $y = -3x + 7$ and $y = -\frac{1}{2}x + 2$ by graphing. Show all your work for full marks. (4 marks)



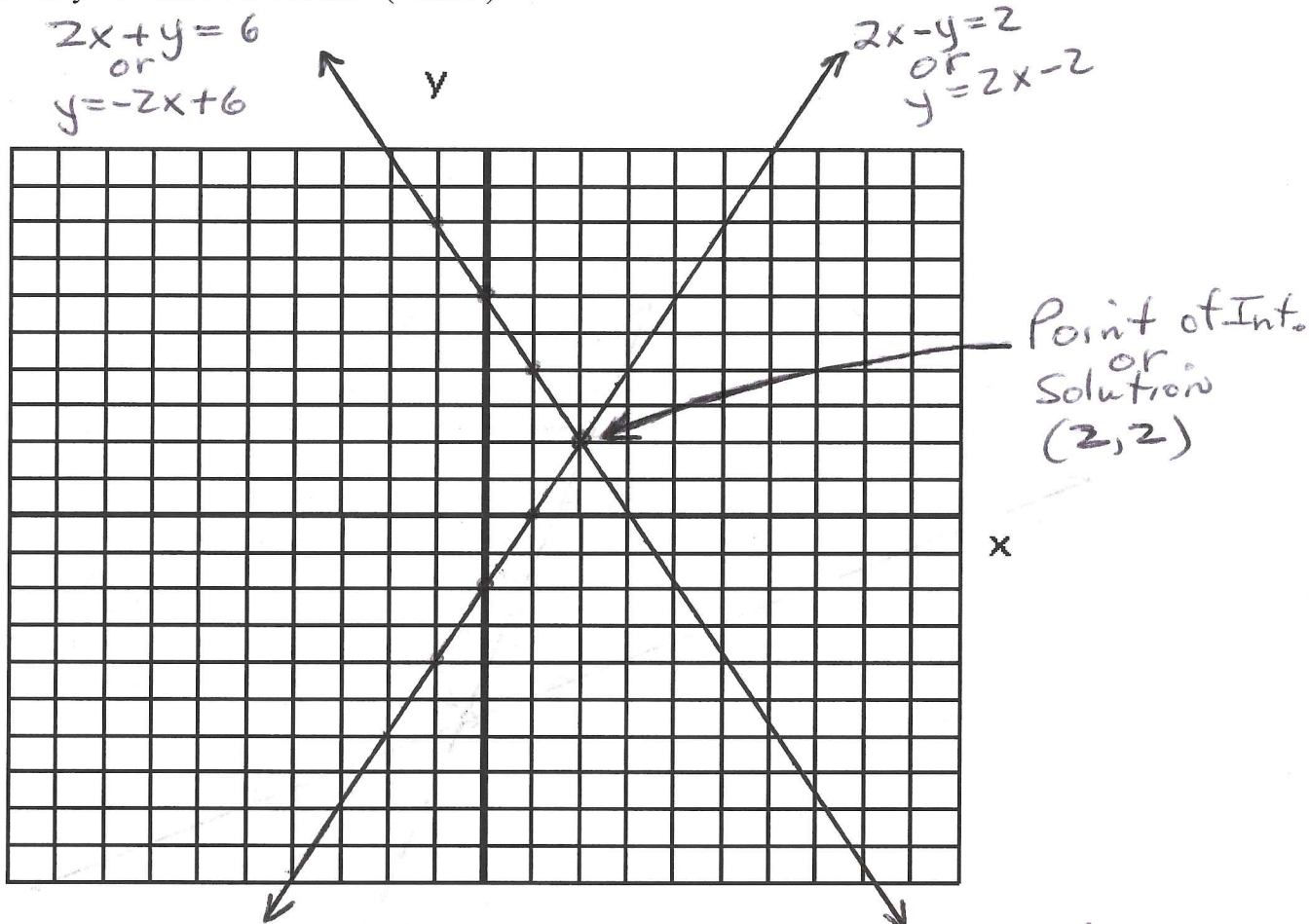
$y = -3x + 7$ means this line has y-intercept of 7 (0, 7)
and has a slope = $m = -3 = \frac{-3}{1}$ or $\frac{3}{-1}$

$y = -\frac{1}{2}x + 2$ means this line has y-intercept of 2 (0, 2)
and has a slope = $m = -\frac{1}{2}$ or $\frac{1}{-2}$

So solution is (2, 1) and this is also the point
of intersection.

/ 4

2. Solve the following system of equations by graphing: $2x - y = 2$ and $2x + y = 6$
 Show all your work for full marks. (4 marks)



To solve: Change both equations to $y = mx + b$ form:

$\begin{array}{r} 2x - y = 2 \\ -2x \quad -2x \\ \hline 6 \end{array}$ $[-y = -2x + 2] \times -1$ $y = 2x - 2$ <p style="text-align: center;"> \uparrow \leftarrow $m = \text{slope}$ $y\text{-int.}$ </p>	$\begin{array}{r} 2x + y = 6 \\ -2x \quad -2x \\ \hline -6 \end{array}$ $y = -2x + 6$ <p style="text-align: center;"> \uparrow \leftarrow $m = \text{slope}$ $y\text{-int.}$ </p>
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Graph using slope $= m = \underline{2} = \underline{2}$ or $\underline{2}$ Graph using $m = \text{slope} = \underline{-2}$ or $\underline{2}$
 and $y\text{-intercept} = \underline{-2} = \underline{-2}$ and $y\text{-intercept} = \underline{6} = \underline{6}$

Expectation #2: Model and solve linear systems of equations.

3. Write a system of linear equations to model the following situation:
Becky and Mario are both limousine chauffeurs. For a ride, Becky charges \$55, while Mario charges \$40. In addition, they each charge an hourly rate. Becky charges \$15/h and Mario charges \$20/h. One day, their charges for two limousine rides were the same.
- (a) What did Becky and Mario charge when both of their rides cost the same amount?
(b) How long did each work when both of their rides cost the same amount?
Show all your work for full marks. (4 marks)

Both Becky and Mario's rides have equations similar to $y = mx + b$ where y represents cost (C) and m represents the hourly rate and x is the number of hours and b is the initial ride charge:

Cost FOR Becky: $C = 15x + 55$

Cost FOR Mario: $C = 20x + 40$

IF both rides cost the same amount then:

$$\begin{array}{r} 15x + 55 = 20x + 40 \\ -15x \quad -15x \\ \hline 55 = 5x + 40 \\ -40 \quad -40 \\ \hline 15 = 5x \\ \div \frac{15}{5} = \frac{5x}{5} \end{array}$$

$3 = x$ → means both Becky and Mario worked for 3 hours.

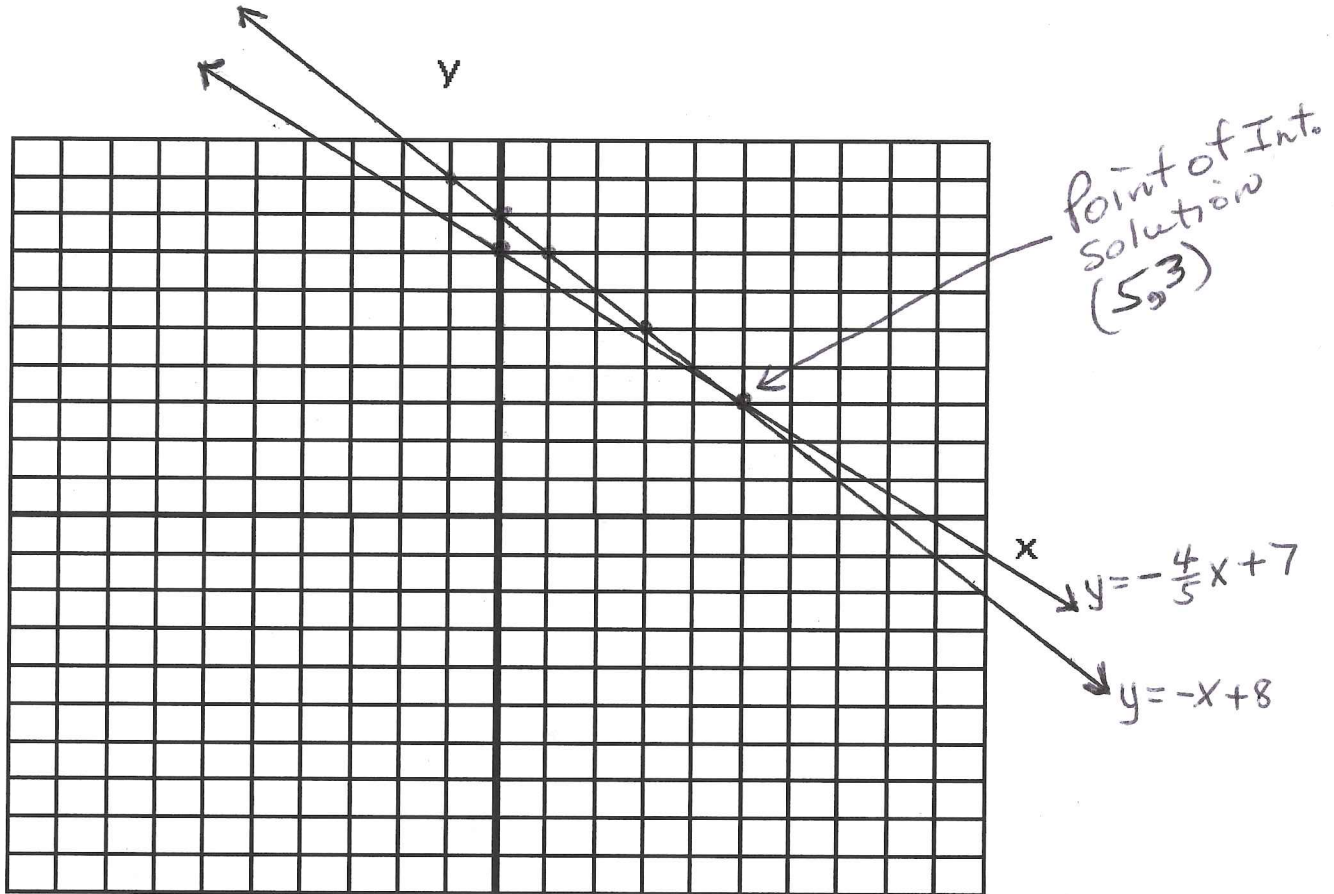
(a) Cost for Becky: $C = 15x + 55$
 $C = 15(3) + 55$
 $C = \underline{\underline{\$100.00}}$

Cost for Mario: $C = 20x + 40$
 $C = 20(3) + 40$
 $C = 60 + 40$
 $C = \underline{\underline{\$100.00}}$

(b) When both of their rides cost the same they both worked for 3 hours.

Problem

4. Write a system of linear equations to model the following situation:
 The school chess club is selling T-shirts for a profit of \$4.00 each and baseball caps for a profit of \$5.00 each. The club wants to sell 8 items and make a profit of \$35.00 in one day.
 How many T-shirts and caps must they sell in one day? Solve this system of equations by graphing.
 Show all your work for full marks. (5 marks)



(y) or Let C = the number of baseball caps sold in 1 day

(x) or Let T = the number of T-shirts sold in 1 day.

Equation 1: $4t + 5c = 35$ OR $4x + 5y = 35 \rightarrow \frac{5y}{5} = \frac{-4x + 35}{5} \rightarrow y = -\frac{4}{5}x + 7$

so we use $m = -\frac{4}{5}$ or $\frac{4}{5}$ and $y\text{-int.} = 7$.

Equation 2: $t + c = 8$ OR $x + y = 8 \rightarrow y = -x + 8$

so we use $m = -1 = -\frac{1}{1}$ or $\frac{1}{1}$ and $y\text{-int.} = 8$.

From Point of Intersection (5, 3): 5 T-shirts must sell in 1 day and 3 baseball caps must sell in 1 day. 15

Expectation #3: Explain why systems of linear equations may have zero, one, or an infinite number of solutions.

5. Determine how many solutions there are to the following linear system without graphing.

$$y = 2x + 1$$

$$y = -3x + 2$$

Show all your work and explain why you know how many solutions exist for full marks.

(4 marks)

$$y = 2x + 1 \rightarrow \text{Same as: } y = mx + b \rightarrow \text{slope} = m = 2$$
$$\text{and } y\text{-intercept} = 1 (0, 1)$$

$$y = -3x + 2 \rightarrow \text{Same as: } y = mx + b \rightarrow \text{slope} = -3 = m$$
$$\text{and } y\text{-intercept} = 2 = (0, 2)$$

/4

Ans: There is ONE (1) solution to this linear system since the 2 slopes are different and the 2 y-intercepts are different.

6. Determine how many solutions there are to the following linear system without graphing.

Show all your work and explain why you know how many solutions exist for full marks.

$$3x + y = 2$$

$$2y = 4 - 6x$$

(4 marks)

$$3x + y = 2: \text{Change to } y = mx + b \text{ form: } \begin{array}{r} 3x + y = 2 \\ -3x \quad -3x \\ \hline 0 \quad y = -3x + 2 \end{array}$$

$$2y = 4 - 6x: \text{Change to } y = mx + b \text{ form: } \begin{array}{r} 2y = 4 - 6x \\ \div 2 \quad \div 2 \quad \div 2 \\ \hline y = -3x + 2 \end{array}$$

/4

So, There are an infinite number of solutions since both equations have the same slope and the same y-intercepts. These two equations produce 2 coincidental lines. /8