Full Name: ANSWER KEY TA#: _____ Date: _____

Math 10 F LG 12 Ver. A **Total Marks _____/ 25**

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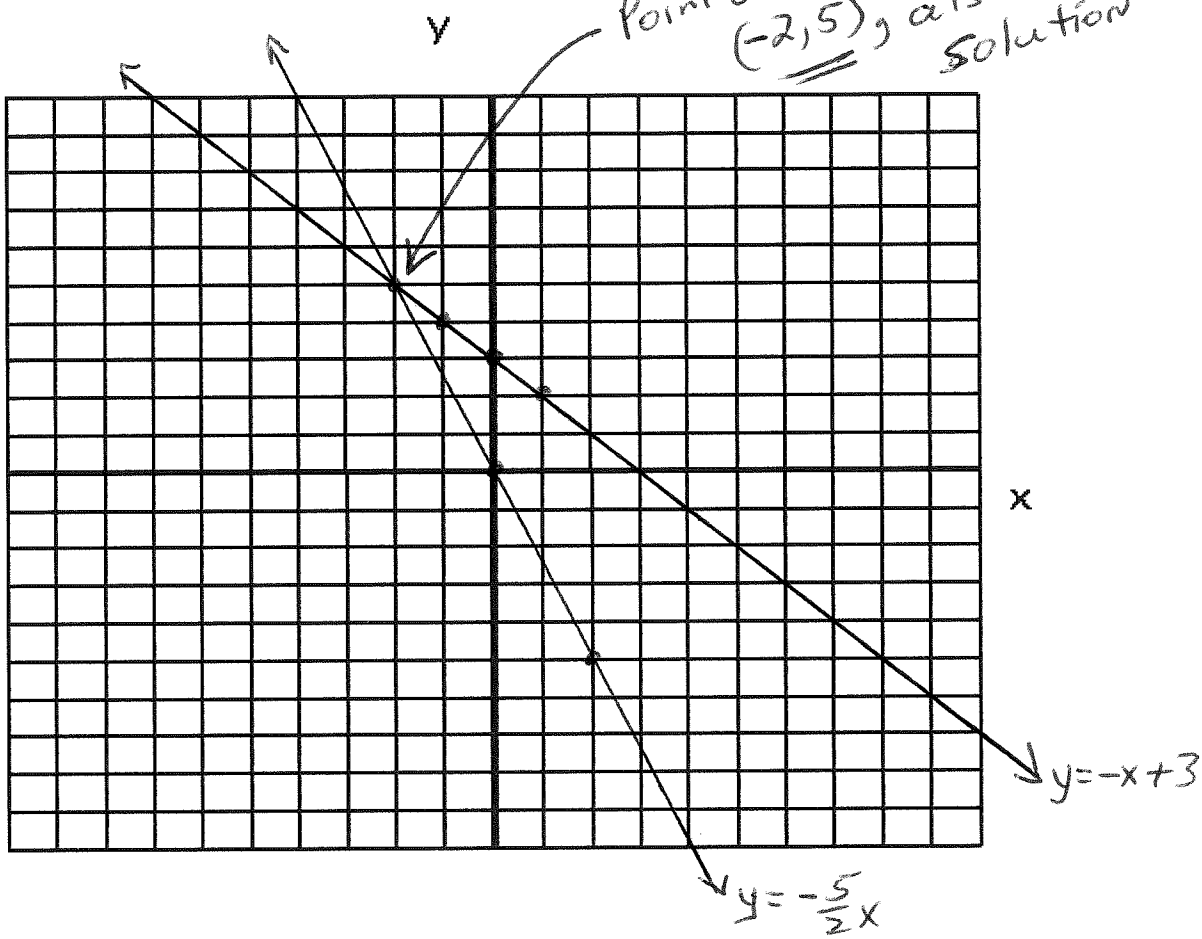
Expectation #1: Solve systems of linear equations graphically.

1. Determine the point of intersection of the lines $y = -\frac{5}{2}x$ and $y = -x + 3$ by graphing. Show all your work for full marks. (4 marks)



Point of Intersection (-2,5), also the solution

$y = -\frac{5}{2}x$ → means this line has a y-intercept of zero (ie. line goes through (0,0))

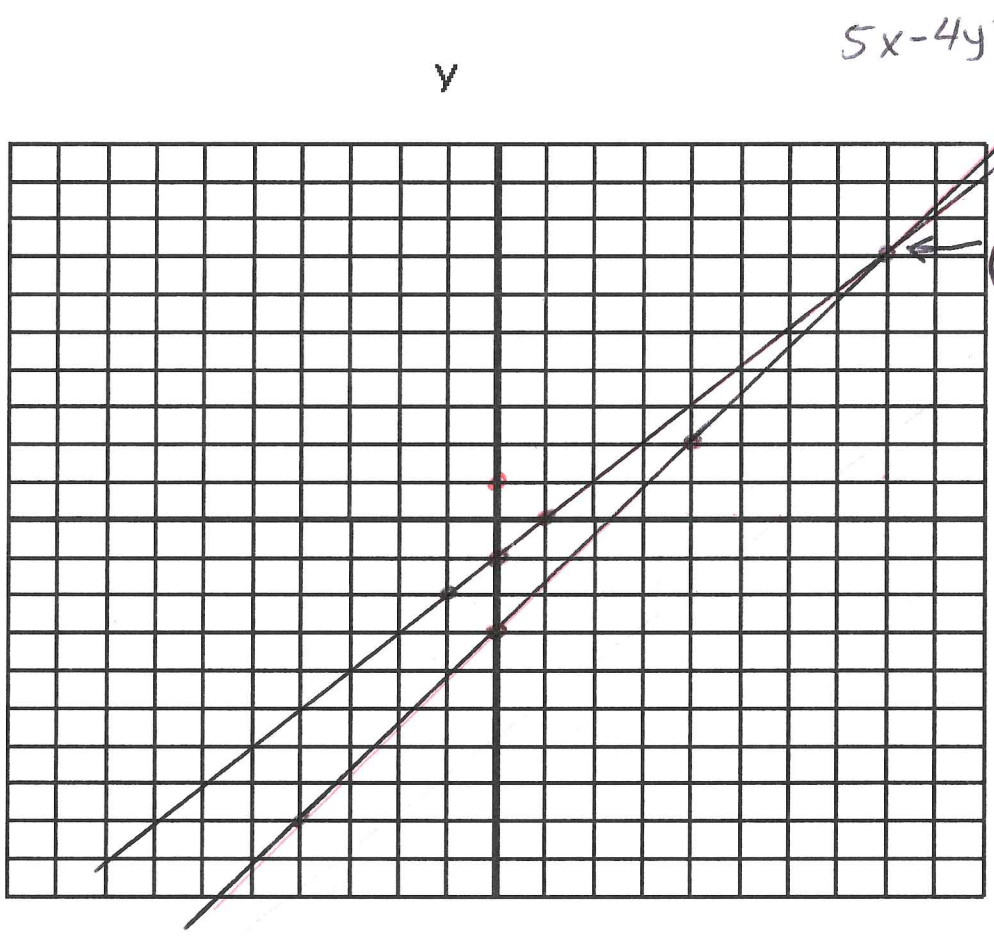
→ and this line has slope = $m = \frac{-5}{2}$ or $\frac{5}{-2}$

$y = -x + 3$ → means this line has y-intercept of (0,3)

and this line has slope = $m = \frac{-1}{1}$ or $\frac{1}{-1}$

So, solution is (-2,5) and this is also the point of intersection. / 4

2. Solve the following system of equations by graphing: $5x - 4y = 12$ and $x - y = 1$
Show all your work for full marks. (4 marks)



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

$5x - 4y = 12$
$-5x \quad -5x$
$-4y = -5x + 12$
$\div -4 \quad \div -4 \quad -4 \div$
$y = \frac{5}{4}x - 3$
m=slope, y-int.

$x - y = 1$
$-x \quad -x$
$-y = -x + 1$
$y = x - 1$
m=slope, y-int.

Graph Using: slope $= m = \frac{5}{4}$ and y-intercept $= -3$

Graph Using: m=slope $= 1$ and y-intercept $= -1$

Draw both lines, find the point of intersection, and check (8,7) in both equations! /4

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

3. Write a system of linear equations to model the following situation:
   One gym (GYM A) membership is $85.00 for the first year plus $30.00 per month.
   Another gym (GYM B) membership is just $35.00 per month.
   (a) Which gym would save you money for a 1 year membership?
   (b) Which gym would save you money for a two year membership?
   Show all your work for full marks. (4 marks)

Gym A Equation: would be similar to $y=mx+b$ form where y represents Cost (C) and m represents the monthly fee and x is the number of months (m), b is the membership fee

$C = 30.00 \times m + 85.00$

OR

$C = 30m + 85$

Gym B Equation: $C = 35m$

(a) For a 1 year membership:

GYM A: $C = 30(12) + 85$
$C = 360 + 85$
$C = \$445.00$

GYM B: $C = 35m$
$C = 35(12)$
$C = \$420.00$

So, GYM B would save you money for a 1 year membership.

(b) For a 2 year membership:

GYM A: $C = 30(24) + 85$
$C = 720 + 85$
$C = \$805.00$

GYM B: $C = 35(24)$
$C = \$840.00$

So, GYM A would save you money for a 2 year membership.

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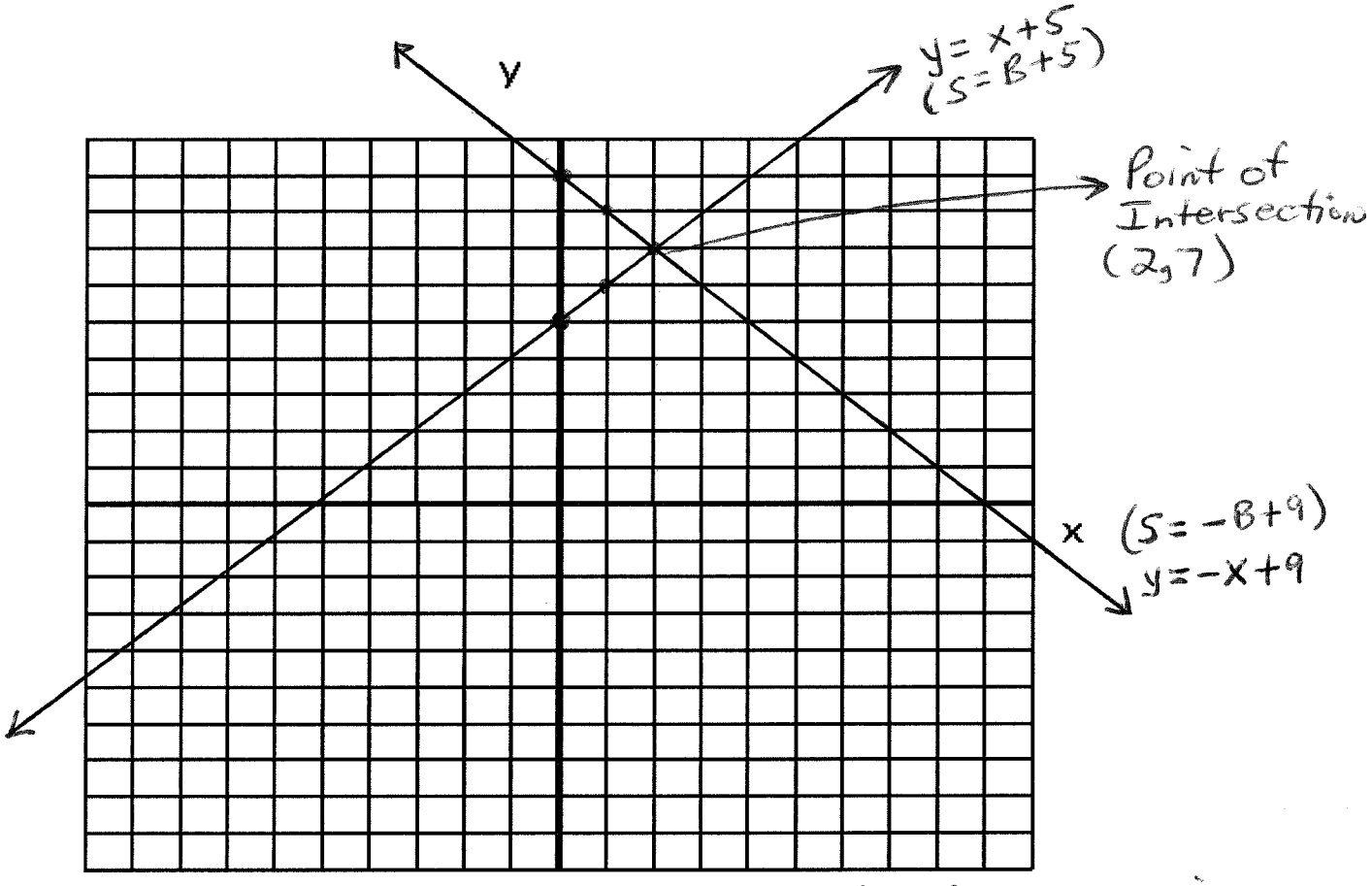
Problem

4. Write a system of linear equations to model the following situation:
Stephanie has five more fish in her aquarium than Brett has in his. The two have a total of 9 fish. How many fish do Stephanie and Brett each have? Solve this system of equations by graphing. Show all your work for full marks. **(5 marks)**



(y) or Let S = the number of fish in Stephanie's aquarium.
(x) or Let B = the number of fish in Brett's aquarium

Equation 1: $S = B+5 \rightarrow$ OR $y = x+5 \rightarrow y = x+5$ ($y = mx+b$)

Equation 2: $S+B = 9 \rightarrow$ $y+x = 9 \rightarrow y = -x+9$ ($y = mx+b$)

$-x \quad -x$

{ y is same as S and x is same as B }

FOR Equation 1 We graph: m = slope = 1 and y-int. is 5

FOR Equation 2 We graph: m = slope = -1 and y-int. is 9

FROM Point of Intersection (2, 7):

Brett has 2 fish and Stephanie has 7 fish.

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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.
$y = x + 1$
$y = 2x - 2$
Show all your work and explain why you know how many solutions exist for full marks.
(4 marks)

$y = x + 1$ → Same as: $y = mx + b$ → slope $= m = 1$
and y-intercept $= 1 = (0, 1)$

$y = 2x - 2$ → Same as: $y = mx + b$ → slope $= m = 2$
and y-intercept $= -2 = (0, -2)$

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

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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.
$x - 2y = 3$
$4y = 2x - 6$
(4 marks)

$x - 2y = 3$ Change to $y = mx + b$ form: $\frac{-2y}{-2} = \frac{-x}{-2} + \frac{3}{-2}$

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

$4y = 2x - 6$ Change to $y = mx + b$ form: $\frac{4y}{4} = \frac{2x}{4} - \frac{6}{4}$

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

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

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