

Name: KEY

Score: _____ / 100

Student ID: Typo on #11

DO NOT OPEN THE EXAM UNTIL YOU ARE TOLD TO DO SO

	1	2	3	4	5	6	7	8	9	10	11	12	Total
✓													
Score													

INSTRUCTIONS FOR STUDENTS

- Questions are on both sides of the paper. This is an 11 question exam (One extra credit problem can be attempted for a total of 12 questions).
- Students have 2 hours and 15 minutes to complete the exam.
- **PLEASE SHOW ALL WORK.** Any unjustified claims will receive no credit. Clearly box your final answer.
- You **MUST** complete 11 problems for credit. In the above table in the row with the ✓, please mark with a ✓ which problems you want to be graded. If you wish to do a 12th problem for extra credit, please write *EC* in the ✓ row for the problem you wish to be counted for extra credit.
- No notes, textbooks, phones, calculators, etc. are allowed for the exam.
- Each of the 11 questions you choose to do will be graded out of 3 points. The score will then be totaled and multiplied by 3 to get a raw score out of 99 points. One point will be given for clearly writing your name on the exam sheet. This will get you to 100 points. If you choose to do a 12th problem for extra credit, the most that will be awarded for that question will be 3 points. So, the highest possible score on this examination is 103 points out of 100.
- The back of the test can be used for scratch work.

GOOD LUCK!

1) Solve the following equation for x :

$$3\left(-\frac{3}{4}x + 1\right) = -\frac{1}{4}(5x - 8)$$

$$\Rightarrow -\frac{9}{4}x + 3 = -\frac{5}{4}x + 2 \quad \text{LCM}=4$$

$$\Rightarrow \begin{array}{r} -9x + 12 \\ +9x \end{array} = \begin{array}{r} -5x + 8 \\ +9x \end{array}$$

$$\begin{array}{r} 12 = 4x + 8 \\ -8 \quad \quad -8 \end{array}$$

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

$$\Rightarrow \boxed{x=1}$$

2) Solve the following equation for P :

$$\frac{A}{\pi} = \frac{\pi(P + Prt)}{\pi}$$

$$\Rightarrow P + Prt = \frac{A}{\pi}$$

$$\Rightarrow P(1 + rt) = \frac{A}{\pi}$$

$$\Rightarrow \boxed{P = \frac{A}{\pi(1 + rt)}}$$

3) During a storm, two teams of scientists leave a university at the same time from the same place, in vans to search for tornadoes. The first team travels to the left at $20 \frac{\text{mi}}{\text{hr}}$ and the second van travels to the right at $25 \frac{\text{mi}}{\text{hr}}$. If their radios have a range of up to 90 mi, how long will it be before they lose radio contact?

\leftarrow 90 mi \rightarrow
 $20 \text{ mph} \leftarrow \boxed{1} \mid \boxed{2} \rightarrow 25 \text{ mph}$

$d = rt$

	$\left(\frac{\text{mi}}{\text{hr}}\right)$ rate	(hr) time	distance = $r \cdot t$
Van 1	20	t	$20t$
Van 2	25	t	$25t$

} added together gives total distance

$$\Rightarrow 20t + 25t = 90$$

$$45t = 90$$

$$t = 2$$

$$\Rightarrow \boxed{2 \text{ hrs}}$$

4) Solve the inequality and write the answer in interval notation:

$$-21 \leq \frac{7}{2}(x-2) < 0$$

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$$2(-21) \leq 2 \cdot \frac{7}{2}(x-2) < 2 \cdot 0$$

$$\frac{-42}{7} \leq \frac{7(x-2)}{7} < \frac{0}{7}$$

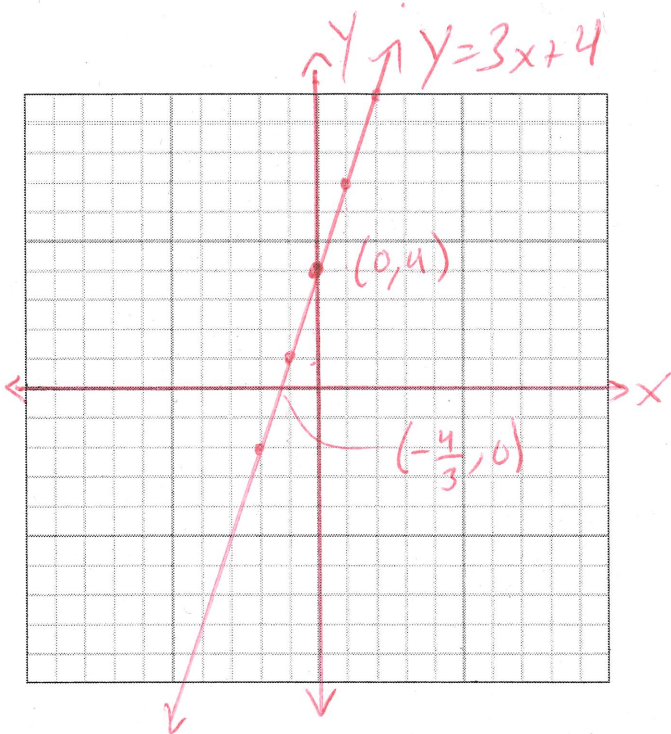
$$\frac{-6}{+2} \leq \frac{x-2}{+2} < \frac{0}{+2}$$

$$-4 \leq x < 2$$

$$\Rightarrow \boxed{[-4, 2)}$$

5) Graph the following equation and clearly state the x and y -intercepts:

$$21x - 7y = -28$$



$$21x - 7y = -28$$

$$\frac{-7y}{-7} = \frac{-21x - 28}{-7}$$

$$y = 3x + 4$$

$$m = 3 \quad y_{\text{int}} = (0, 4)$$

$$0 = 3x + 4$$

$$-4 = 3x$$

$$-\frac{4}{3} = x$$

$$\Rightarrow x_{\text{int}} = \left(-\frac{4}{3}, 0\right)$$

6) Determine whether the lines through each pair of points are parallel, perpendicular, or neither:

$$(-2, 4) \text{ and } (6, -7)$$

$$(-6, 4) \text{ and } (5, 12)$$

$$m_1 = \frac{\Delta y}{\Delta x} = \frac{-7 - 4}{6 - (-2)} = -\frac{11}{8}$$

$$m_2 = \frac{\Delta y}{\Delta x} = \frac{12 - 4}{5 - (-6)} = \frac{8}{11}$$

$$m_1 \cdot m_2 = \left(-\frac{11}{8}\right) \left(\frac{8}{11}\right) = -1$$

\Rightarrow perpendicular

7) Find for the following line:

- the slope,
- the y -intercept,
- and the x -intercept

$$\frac{3}{4}x - \frac{1}{8}y = \frac{1}{2}$$

$$\Rightarrow \frac{8 \cdot 3}{4}x - \frac{8}{8}y = \frac{8}{2}$$

LCM=8

$$\Rightarrow 6x - y = 4$$

$$\Rightarrow \frac{-y}{-1} = \frac{-6x+4}{-1} \Rightarrow y = 6x - 4$$

$$\Rightarrow \boxed{m=6}$$

$$\boxed{y_{int} = (0, -4)}$$

$$\boxed{x_{int} = (\frac{2}{3}, 0)}$$

$$0 = 6x - 4$$

$$4 = 6x$$

$$\Rightarrow x = \frac{2}{3}$$

- 8) a) Use the point slope formula to find the equation of the line passing through $(-4, 3)$ and $(2, 0)$.
 b) Write the line in the form $y = mx + b$.
 c) Graph the line on the plot below.

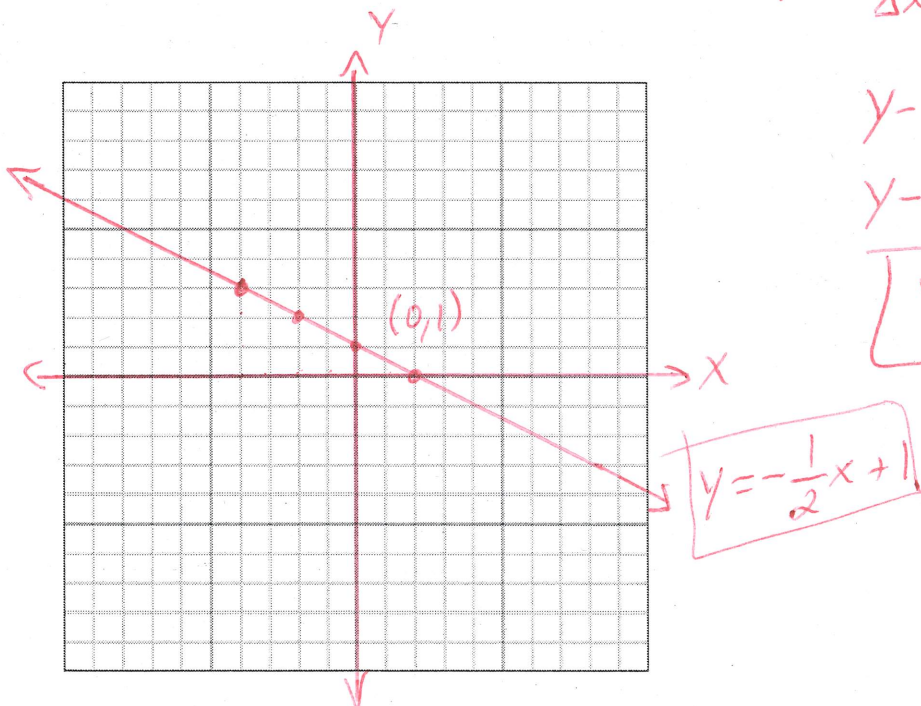
$$m = \frac{\Delta y}{\Delta x} = \frac{3-0}{-4-2} = \frac{3}{-6} = -\frac{1}{2}$$

$$\boxed{m = -\frac{1}{2}}$$

$$y - y_1 = m(x - x_1)$$

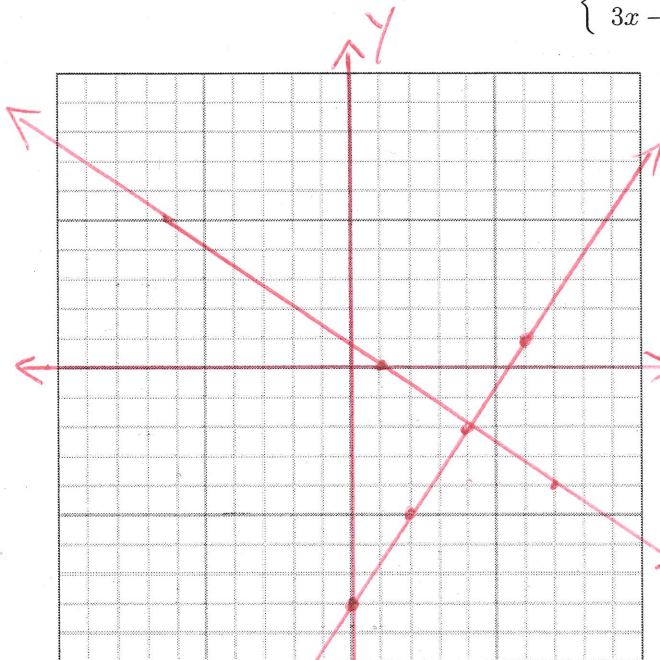
$$y - 0 = -\frac{1}{2}(x - 2)$$

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



9) Solve the system of equations by graphing:

$$\begin{cases} 2x + 3y = 2 \\ 3x - 2y = 16 \end{cases}$$



$$\begin{aligned} \textcircled{1} &\Rightarrow \frac{3y}{3} = \frac{-2x+2}{3} \\ & y = -\frac{2}{3}x + \frac{2}{3} \quad m = -\frac{2}{3} \end{aligned}$$

$$\begin{aligned} \textcircled{2} &\Rightarrow 3x - 2y = 16 \\ & -2y = -3x + 16 \\ & y = \frac{3}{2}x - 8 \end{aligned}$$

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

$$\Rightarrow \boxed{(4, -2)}$$

10) Use either the substitution method or the elimination method to solve the following system of equations:

$$\begin{cases} \frac{1}{3}x - \frac{1}{6}y = -\frac{2}{3} & \text{LCM} = 6 \\ \frac{2}{3}x - \frac{1}{4}y = \frac{3}{2} & \text{LCM} = 12 \end{cases}$$

$$\begin{aligned} \Rightarrow 2x - y &= -4 \\ 8x - 3y &= 18 \end{aligned}$$

Multiply $\textcircled{1}$ by -3

$$\begin{aligned} \Rightarrow -6x + 3y &= 12 \\ 8x - 3y &= 18 \end{aligned}$$

$$\begin{aligned} 2x &= 30 \\ x &= 15 \end{aligned}$$

$$\begin{aligned} 2x - y &= -4 \quad \text{plug in } x=15 \\ 2(15) - y &= -4 \end{aligned}$$

$$\begin{aligned} 30 - y &= -4 \\ -y &= -34 \\ y &= 34 \end{aligned}$$

$$\boxed{(15, 34)}$$

11) The sum of both the lengths and both the widths of a large painting is 36 feet. The difference between the length and width is 2 inches. Find the length and width of the painting.

Hint: You must set up equations to solve this problem for full credit.

$$P = 36 \text{ ft} \quad l - w = 2 \Rightarrow l = w + 2$$

$$P = 2l + 2w$$

$$2(w + 2) + 2w = 36$$

$$2w + 4 + 2w = 36$$

$$4w + 4 = 36$$

$$\begin{array}{r} 4w + 4 = 36 \\ -4 \quad -4 \\ \hline 4w = 32 \end{array}$$

$$4w = 32$$

$$w = 8$$

$$l = w + 2$$

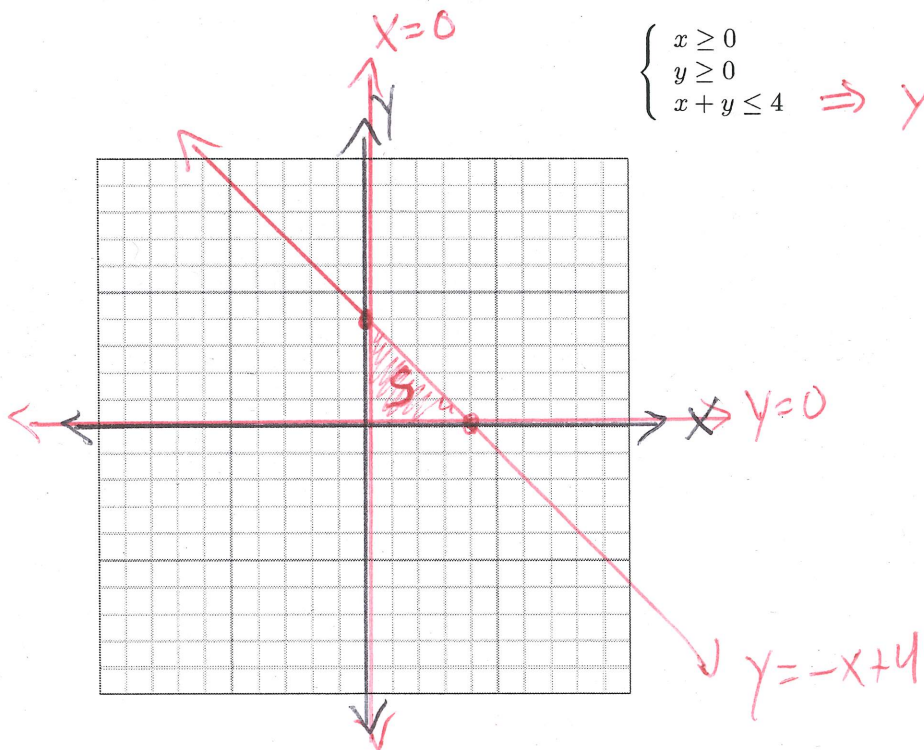
$$l = 8 + 2$$

$$l = 10$$

$$\begin{array}{l} \text{length} = 10 \text{ ft} \\ \text{width} = 8 \text{ ft} \end{array}$$

12) Graph the solution of the following system

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ x + y \leq 4 \end{cases} \Rightarrow y \leq -x + 4$$



THIS PAGE IS LEFT BLANK FOR ANY SCRATCH WORK

END OF TEST