Math 12 Exam 1 Name:_____

Instructions: Please answer legibly, logically, and **show all work**. Your goal is to convince me you understand the material, so no credit will be given for unjustified or unclear work, including guess-and-check. Remember that explaining and words are a critical part of math – if you get stuck, try to explain what you would do if you could get past your sticking point. Be sure to answer the question or perform the task you are asked.

1. (10 pts) Perform the operations, following the correct order. Simplify into a single fraction and reduce if needed.
   (a) $\frac{2}{3} - \frac{5}{6} + 2$

   (b) $\frac{5}{9} \div \frac{4}{5} + \frac{1}{4}$

2. (5 pts) Solve for x.

   $-4(-2x + 2) - 8x = 4(x - 6) - 2$

3. (7 pts) Solve the compound inequality and represent it graphically on a number line and in interval notation.

$2x + 1 \geq -10$ **and** $4x + 4 > 24$

Interval Notation:

4. (5 pts) Find the solution set to the absolute value equation.

$$6\left|\frac{1}{2}x - 5\right| - 1 = 2$$

5. (2 pts) Explain why the solution set to the inequality $|x| > -1$ is $(-\infty, \infty)$ (aka all real numbers).

(a) (1 pt) Give an example of *any* linear equation written in slope-intercept form.

(b) (2 pts) Give an equation of *any* line perpendicular to the line you gave in part (a).

6. (5 pts) Consider the line $y = 3x - 4$. Find the equation of the line that is parallel to the given line and passes through the point (-7,-6).

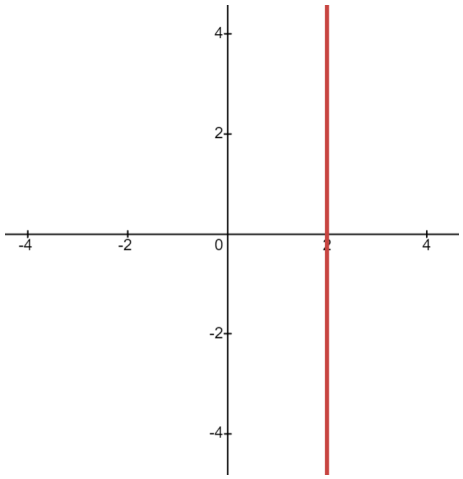
7. (5 pts) A new telescope is being used to observe a distant galaxy. The telescope captures an image at a rate of 5 images per hour. The total number of images $I(t)$ captured after t hours is given by the function: $I(t) = 5t$.

   (a) How many hours have passed if the telescope has captured 75 images?

   (b) How many images will the telescope have captured after 24 hours?

8. (4 pts) Give the slope and state the equation of each graphed line.

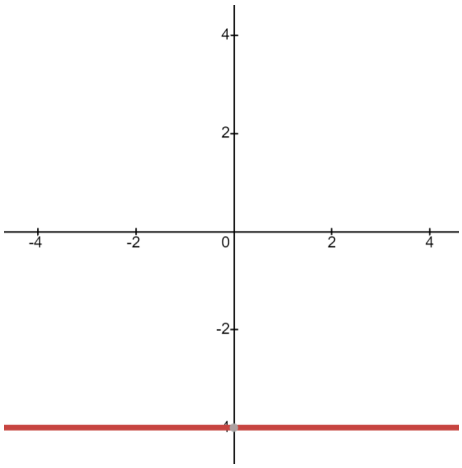
(a)



Slope:

Equation:

(b)

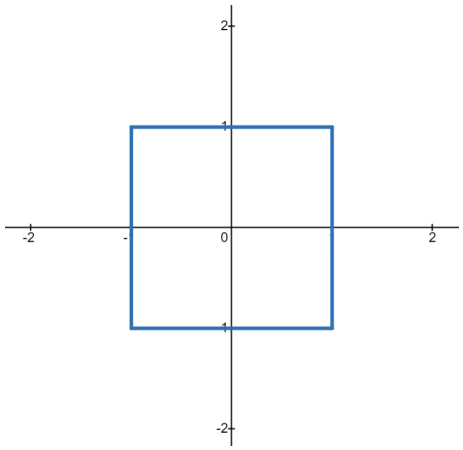


Slope:

Equation:

9. (6 pts) For each relation graphed below, state if the graph also represents a function and briefly explain how you know. Then give the domain and range in interval notation.

(a)

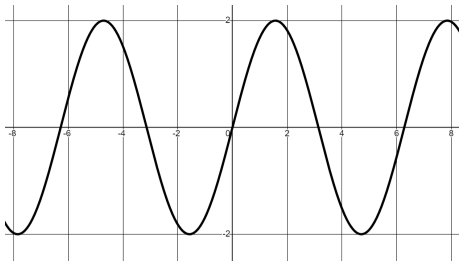


Function?:

Domain:

Range:

(b)



Function?:

Domain:

Range:

10. (5 pts) Consider the function $f(x) = 5x + 7$.

    (a) Find $f(-4)$.

    (b) Find the value of x such that $f(x) = 27$.

11. (5 pts) Solve the system of linear equations.

$$\begin{cases} -4x = 8 + 2y \\ 10x + 7 = 4y \end{cases}$$

12. (7 pts) Ben and Jack are selling popcorn and wrapping paper to raise money for the Math Club. Yesterday, Ben sold 4 tins of popcorn and 6 rolls of wrapping paper and earned \$36. Jack sold 6 tins of popcorn and 2 rolls of wrapping paper and earned \$26. Find the cost of each tin of popcorn and each roll of wrapping paper. [Make sure to clearly define variables, set up equation(s), and solve them].

13. (7 pts) Graph and clearly identify the solution set to the system of linear inequalities.

$$\begin{cases} y \leq \frac{1}{2}x + 2 \\ 2x + y < -3 \end{cases}$$

Use the area below to show any work used in graphing the solution set. No credit will be given for shading without reason.