Math 34A - Test 1

- There are 3 short answer questions and 3 multi-part questions.
- You have 75 minutes from the time you start to complete the exam. Please remember that you should only spend 60 on the exam - the remaining 15 minutes are to give you time to upload the exam to Gradescope.
- You may use a calculator and anything you can find on the Gauchospace page. Please do not use other resources or talk to anybody about the questions or your answers.

1. Short Problems

(1) *(2 points)* If $\frac{x^2}{x-1} = x + 4$, what is x?.

Scratch Work:

Answer: $x =$

(2) *(2 points)* Simplify the following expression as much as possible:

$$\sqrt{(x^2+9)^2 - (x^2-9)^2}$$

Scratch Work:

Answer:

(3) *(2 points)* Solve the following system of equations:

$$2x - 4y = 4$$
$$-4x + 7y = 8$$

Scratch Work:

Answer:

$x =$
$y =$

2. Multi-part problems

2.1. Problem 4.

2.1.1. *Set-up.* You want to make a *sauce velouté*, and you found a recipe that calls for:

- 3 cups of stock.
- 3 tablespoons of flour.
- 5 tablespoons of butter.

Note: 1 cup = 16 tablespoons.

2.1.2. *Questions.*

(1) *(2 points)* How many cups of sauce does the recipe produce? *Note: In real life, the volume of the sauce decreases due to evaporation, but you can ignore that - the question is just asking how much total volume you have when you combine 3 cups, 3 tablespoons and 5 tablespoons.*

(2) *(3 points)* You're making dinner for a big group, and you will need 108 cups of *sauce velouté*,

(a) How many **cups** of butter will you need?

(b) How many **cups** of flour will you need?

2.1.3. *Scratch Work.*

2.1.4. *Answers.*

(1) ☐ cups of sauce velouté.

(2) (a) ☐ cups of butter.

(b) ☐ cups of flour.

2.2. Problem 5.

2.2.1. *Set-up.* I put together two right triangles to form a quadrilateral with edges of lengths 1, a, b and 9. (*See Figure 1.*)

- The perimeter of the quadrilateral is 22.
- The edge which has length a is half as long as the edge which has length b.

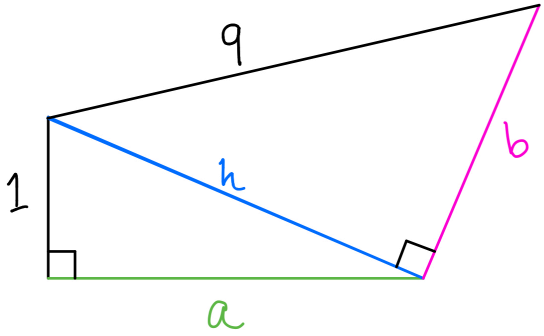

FIGURE 1. Triangles

2.2.2. *Questions.*

(1) *(3 points)*
   (a) How long is the green edge?

   (b) How long is the pink edge?

(2) *(2 points)* How long is the edge shared by the two right triangles?

2.2.3. *Scratch work.*

2.2.4. *Answers.*

(1) (a) $a =$

(b) $b =$

(2) $h =$

2.3. Problem 6. For this problem, refer to Figure 2.

I've drawn a three lines in the xy-plane that form an"extended triangle" with vertices $(8, 0), (0, 24), (x_0, y_0)$.

To make your lives easier, I will give you the equations of two of those lines:

$$y = 2x + 24$$
$$y = 22x - 176$$

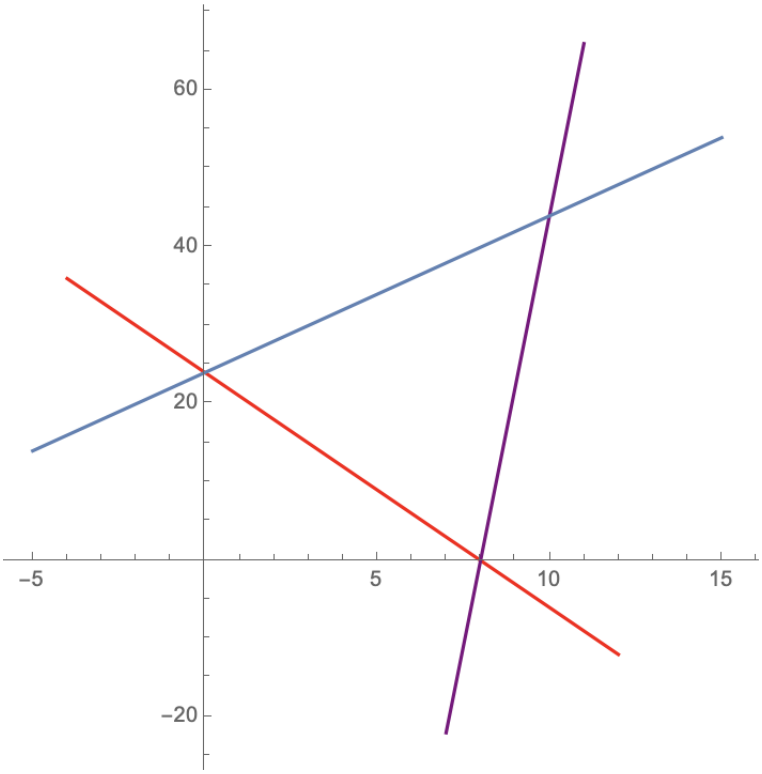

FIGURE 2. "Extended" Triangle

2.3.1. *Questions.*

(1) *(3 points)* What is the equation of the third line? *Give your answer in the form* $y = mx + b$.

(2) *(3 points)* Determine the coordinates of the third vertex.

2.3.2. *Scratch work.*

2.3.3. *Answers.*

(1) $y =$

(2) $(x_0, y_0) =$