1. Short Problems

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

Scratch Work:

Answer: $x =$

(2) Let $x = 3y + c$. If $3x^2 - 2x + 6 = 27y^2 + \frac{17}{3}$, what is c?

Scratch Work:

Answer: $c =$

(3) Solve the following system of equations:

$$17x - 3y = 64$$
$$2x + 3y = 88$$

Scratch Work:

Answer:

$x =$

$y =$

2. Word problems

2.1. The roux. You're making a roux. The recipe requires 3:2 ratio of butter to flour.

2.1.1. *Questions.*

(1) You want to make 15 cups of roux. How much butter do you need? Express your answer in cups.

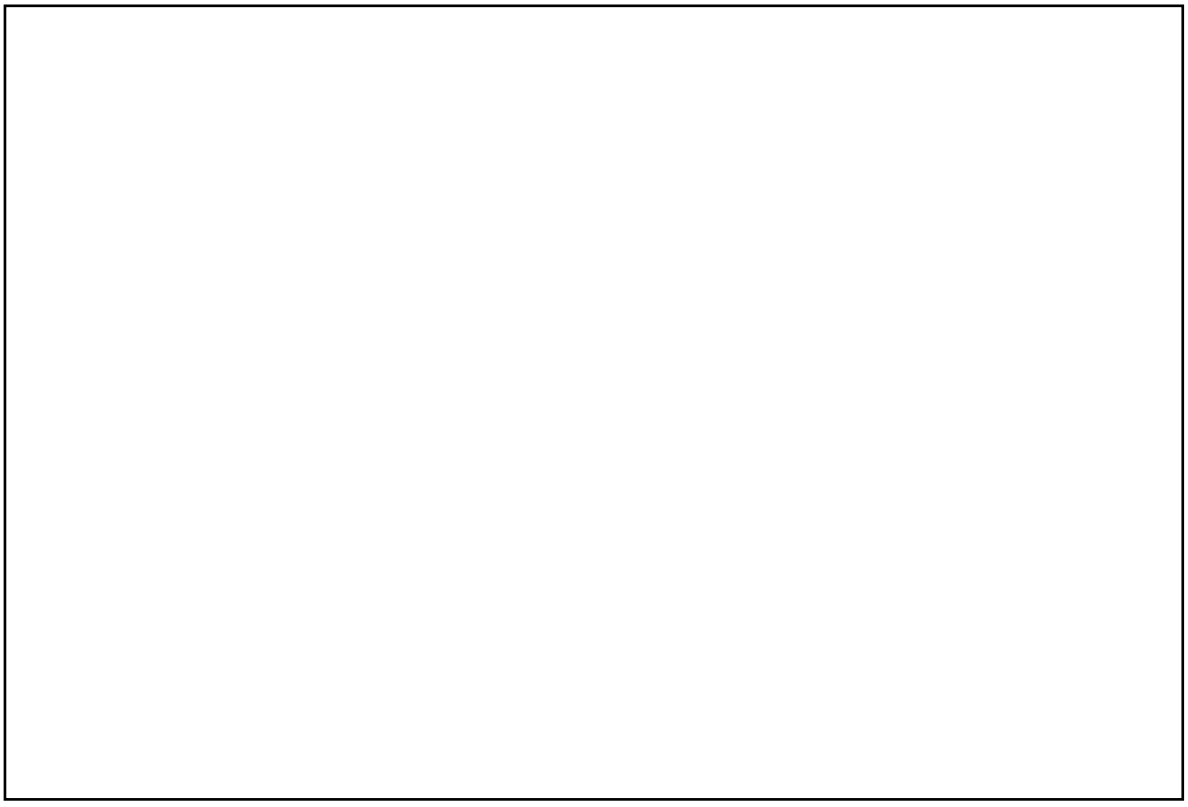
(2) After making 15 cups of roux (with the correct butter-flour ratio), you accidentally add a cup of flour. How much butter should you add to the mixture so that the ratio of butter to flour is 3:2?

2.1.2. *Answers.*

(1) ☐ cups of butter for the original recipe.

(2) ☐ cups of butter need to be added.

2.1.3. *Scratch Work.*



2.2. Triangles. For this problem, refer to Figure 1.

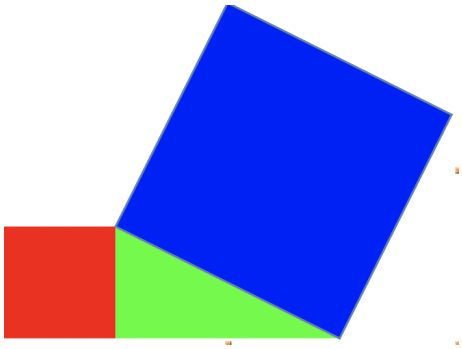


FIGURE 1. Triangles

- The red square has area A.
- The base of the green triangle has length A.

2.2.1. *Questions.*

(1) Compute the length of of the hypotenuse of the triangle.

(2) Compute the area of the blue square.

(3) Assume the area of the blue square is exactly 4 times the area of the red square. What is A?

2.2.2. *Answers.*

(1) Length of hypotenuse: $\boxed{}$

(2) Area of blue square: $\boxed{}$

(3) $A =$ $\boxed{}$

2.2.3. *Scratch work.*

2.3. Compute the vertices. For this problem, refer to Figure 2.

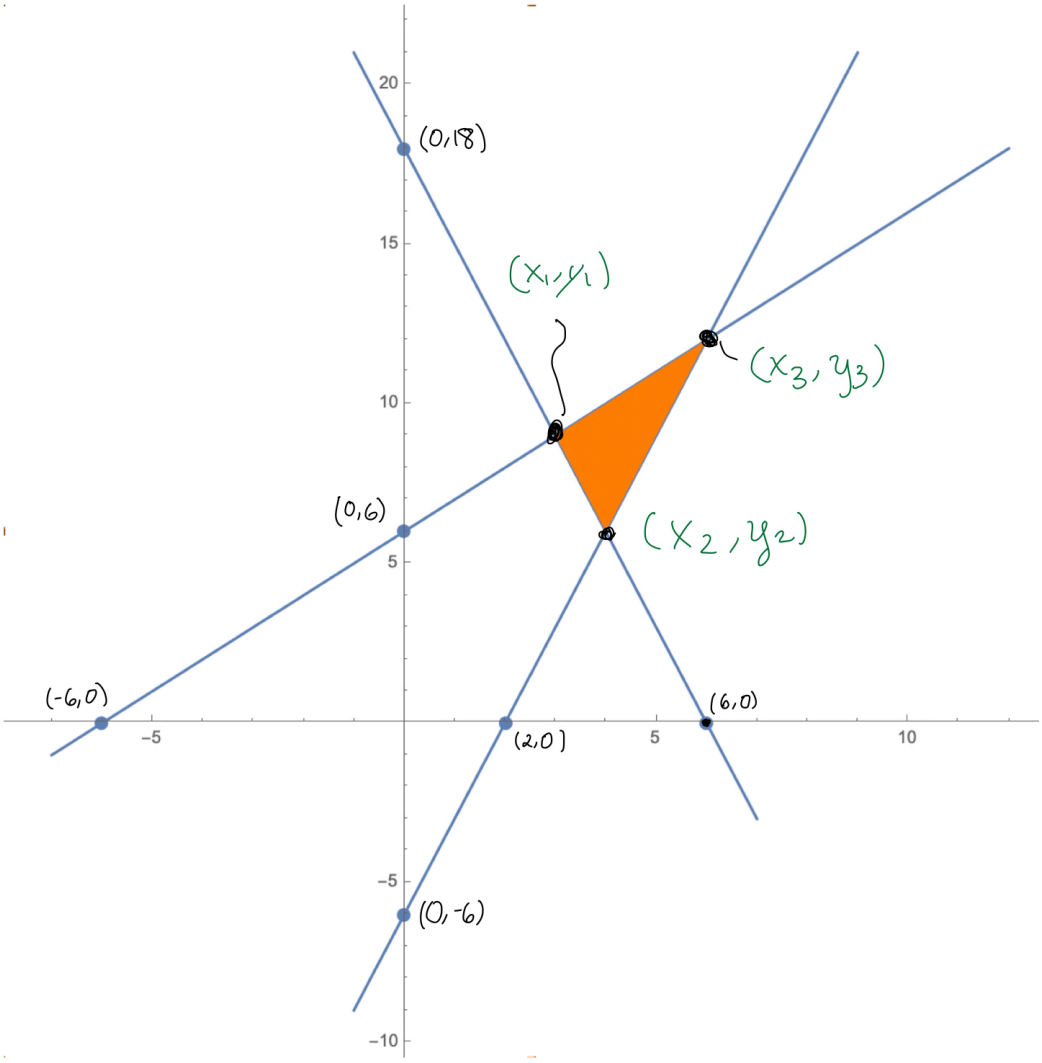


FIGURE 2. Orange Triangle

(1) Determine the equations of the three lines in the graph. Write your answers in the form $y = mx + b$.
(2) Determine the coordinates of the vertices of the orange triangle.

2.3.1. *Answers.*

(1) Equations of lines:

- Equation of the line through (x_1, y_1) and (x_2, y_2):

$y =$

- Equation of the line through (x_1, y_1) and (x_3, y_3):

$y =$

- Equation of the line through (x_2, y_2) and (x_3, y_3):

$y =$

(2) Coordinates of vertices:

- $(x_1, y_1) =$
- $(x_2, y_2) =$
- $(x_3, y_3) =$

2.3.2. *Scratch work.*