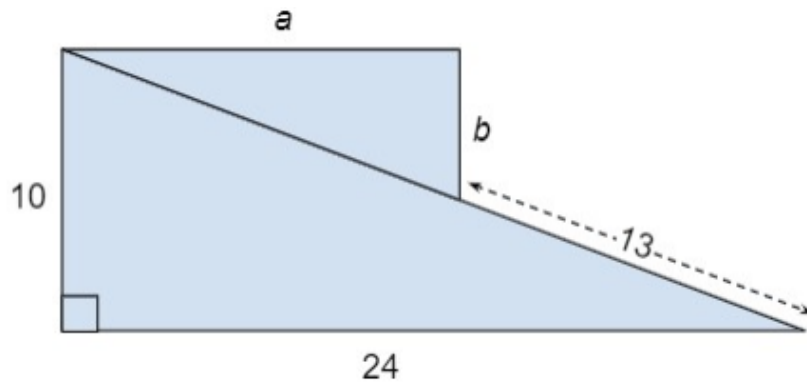


Math 113 Stretch 3

Spring 2023, Section 4, Mr. Joshua Siktar

February 24, 2023

1 [Tri]Angles [9 points]



Suppose the larger triangle is a building [floor plan], and the sides that are labeled a and b are fence lines for an enclosure that will connect to the hypotenuse side of the building. Assume the two triangles are similar. You need to find out how much fencing to purchase.

- What quantity are you going to be looking for, in terms of a and b ? In other words, what mathematical expression, using a and b as variables, represents how much fencing will need to be purchased?
- Describe what you would do to find the answer. What theorems or strategies would you use, in what order, and on which triangles?
- Find a and b .

2 Right Angles and Right Triangles [10 points]

The parts of this problem aren't directly dependent on each other, but they all have to do with right triangles.

- a. Can a triangle have two right angles? Why or why not?
- b. Two side lengths of a right triangle are 3 and 5. What are the possible side lengths of the third side?
- c. A right triangle has one angle of measure 90 degrees. What is the maximum possible value of the product of the other two angles? (Hint: use trial and error; pick different values for the angles and multiply them together)

3 Circumferences and Areas [9 points]

- a. If a circle has circumference of 6π inches, find its area.
- b. Take a circle of radius 12 cm, and cut out a square from the middle of the circle with side length 2 cm. What is the area of the figure? Show your work.
- c. **Bonus [up to 3 points]:** You are making donuts, but you foolishly bought your box before making any donuts. The box is rectangular, 10 inches wide and 12 inches long. You want to make the donuts so that the diameter of each “whole” donut is 3 inches, and the hole in the middle of each donut is 1 inch in diameter. If you make as many donuts as will fit into the box, how much area of the bottom of the box will be occupied by donuts? *Hint: first figure out how many donuts you can fit into the box*
- Assumptions: the box has no lid, so you don't need to worry about height. Also, you cannot break any donuts into pieces (because that would make them look ugly), but the donuts may touch each other.