

**Problem 3 (32 marks).**

A circle is inscribed in a triangle whose sides are  $a$ ,  $a$  and  $b$  units long. A second circle is inscribed to be tangent to the first circle and to the congruent sides of the triangle. A third circle is inscribed to be tangent to the first circle, the base of the triangle and one of the congruent sides (see the diagram below).



You can find your values for  $a$  and  $b$  in the table below.

$$a = 25 \quad b = 14$$

(length of base)

- Find radii of all three circles.
- find the shaded area 1.
- Find the radius of a circle that is circumscribed about the triangle.
- In some isosceles triangles there is a line drawn through the base and one side of the triangle (but not passing through any vertex) that divides both the perimeter and the area into two equal halves. Determine whether such a line exists in your triangle. If the answer is "yes", find the measures of the segments of the base cut by this line. If the answer is "no", explain why.

Please vaguely explain your thought process. I find this is an easier way of doing things instead of meeting up for tuition, because that way you can do things in your own time. Many thanks for the help.

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$$xy \sin 32.52 = 17.5$$

$$x + y + \frac{1}{2} \sqrt{x^2 + y^2 - 2xy \cos 32.52}$$