Challenge Problem 2

A triangle has sides of lengths 3, 4, and 5.

(a) Find the area of the triangle.

Find the distance to the side of length 5 from the opposite vertex.

(b) A line segment is drawn perpendicular to the side of length 5, with one endpoint situated on the side of length 5 and the other endpoint at the opposite vertex.

This line segment divides the original 3-4-5 triangle into two smaller triangles. Find the area of each.

One method of solution is to show that triangles are similar.

Which, if any, of the three triangles (the original and the two smaller) are similar?

(c) A line segment is drawn connecting the midpoint of the side of length 5 with the opposite vertex.

This line segment divides the original 3-4-5 triangle into two smaller triangles. Find the area of each.

Are the two smaller triangles similar? Is either of the two smaller triangles similar to the original triangle?

If a perpendicular were dropped from the midpoint to either of the two legs of the original triangle, would one of the triangles formed be similar to the original triangle?