

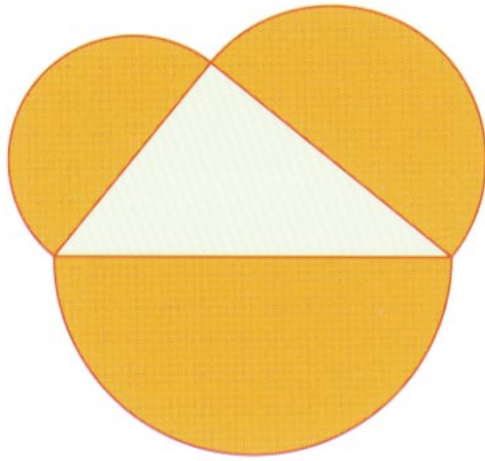
# Pythagoras Without Squares

## Problem-of-the-Week

### The Problem

If similar figures are constructed on the sides of a right triangle, then the area of the polygon on the hypotenuse equals the sum of the areas of the polygons on the legs.

Prove that this extension of the Pythagorean Theorem is true if the “similar figures” are semicircles.



### Strategies and Hints

1. Label the sides of the right triangle  $a$ ,  $b$ , and  $c$ , using  $c$  for the hypotenuse. Prove that the extension is true for the isosceles right triangles shown in the figure at the right.
2. Prove that the extension is true for isosceles triangles in which the measures of the bases equal the measures of the sides of the triangle and the measures of the altitudes equal half the measures of the sides.
3. Develop a formula for the area of a semicircle in terms of the diameter of the circle,  $d$ . Then use this formula in your proof.
4. Prove the extension for equilateral triangles.

