

## Understanding the Pythagorean Theorem

1. There are two drawings on the attached pages. On a sheet of patty paper make a tracing of the illustrated right triangle. Each picture has three squares built on the three sides of a right triangle. Cut out the two smaller squares and cut the squares along the dotted lines. Rearrange the two smaller squares in the largest square.
2. If the length of the legs are  $a$  and  $b$  and the length of the longest side, the hypotenuse, is  $c$ , then how much area is in each of the three squares?
3. Since the area of the two smaller squares added up to the area of the largest square, what statement could we write?
4. Let's look at this another way on patty paper. On page 3 there is another right triangle.
5. Label the hypotenuse  $c$ , the shorter leg  $a$  and the longer leg  $b$ .
6. Locate the center of the square on the longer leg by lightly drawing in the two diagonals. Label this point  $O$ .
7. Through point  $O$  construct a line  $j$  that is perpendicular to the hypotenuse  $c$ . Through point  $O$  construct a line  $k$  that is perpendicular to line  $j$ . Lines  $j$  and  $k$  should divide the square on the longer leg into four parts. Cut out the squares on the two legs and rearrange them to fit in the largest square.
8. Does this confirm the statement you made in question 3?
9. Complete the following statement: In a right triangle, the sum of the squares of the lengths of the legs equals the square of the length of the hypotenuse. If  $a$  and  $b$  are the lengths of the two legs and  $c$  is the length of the hypotenuse, then \_\_\_\_\_
10. Let's confirm this algebraically.
  - Find the area of each shaded triangle
  - Find the area of the large square
  - Find the area of the small square.
  - But the three statements together to conclude that  $a^2 + b^2 = c^2$





