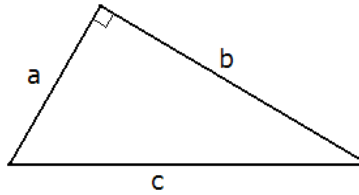
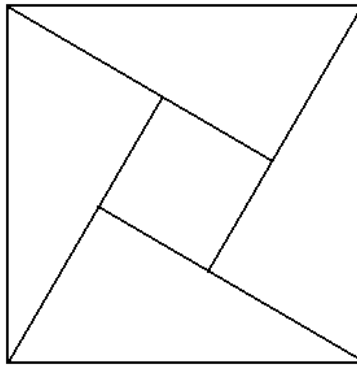


Puzzle 12 - SOLUTION

There is a lot of different proofs of the Pythagorean Theorem. This is one I really like. Consider the right triangle shown on the picture below.



We used four identical triangles to create the figure shown on the picture below.



1. Find the area of the big square in terms of c .

Solution: c^2

2. Find the area of the small rectangle in the middle in terms of a and b .

Solution: The rectangle in the middle is a square with sides $b - a$ units long. Thus the area is $(b - a)^2$

3. Find the area of the big square as the sum of 5 areas: four triangles and the small rectangle in the middle.

Solution:

$$4 \cdot \frac{ab}{2} + (b - a)^2 = 2ab + b^2 - 2ab + a^2 = a^2 + b^2$$

So the area is:

$$\begin{aligned} A &= c^2 \text{ and} \\ A &= a^2 + b^2 \text{ which means} \\ c^2 &= a^2 + b^2 \end{aligned}$$

This completes the proof of the Pythagorean Theorem.