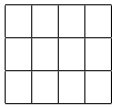
Proof of the Pythagorean Theorem

Proof

Consider a right triangle with sides of length a, b, and hypotenuse c.

We can construct a square with side length $a + b$ and place four copies of the right triangle inside it, as shown below:



The area of the large square is $(a + b)^2$.

The four right triangles each have an area of $\frac{1}{2}ab$.

The remaining area in the center is a smaller square with side length c, so its area is c^2.

Thus, we have:

$$(a + b)^2 = 4\left(\frac{1}{2}ab\right) + c^2$$

Simplifying, we get:

$$a^2 + 2ab + b^2 = 2ab + c^2$$

Subtracting $2ab$ from both sides, we obtain:

$$a^2 + b^2 = c^2$$

This completes the proof of the Pythagorean theorem.