

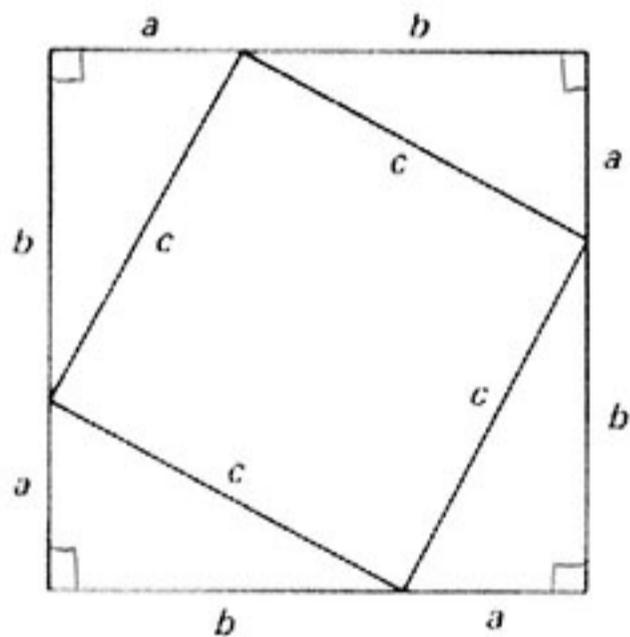
12/10

Math Explorations

Pythagorean Theorem Proof

Conjecture – $A^2+B^2=C^2$ when C = hypotenuse of a right triangle

Proof – The easiest way to prove the Pythagorean Theorem is to arrange 4 right triangles in a square, as seen in picture 1. This leaves you with a square with side lengths (A+B). Therefore, the area of the square equals $(A+B)^2$. The next step is to form an equation setting that area equal to the pieces of the square, which are the four triangles, ABC, and the smaller square with side lengths C, otherwise known as C^2 . With a little algebra seen in picture 2, the equation works out to prove that $A^2+B^2=C^2$.



Picture 1 – four right triangles, ABC, arranged in a pattern to prove the Pythagorean Theorem.

whole square = triangles + smaller square

$$(A+B)^2 = (4) \frac{1}{2} ab + C^2$$
$$A^2 + 2AB + B^2 = 2AB + C^2$$
$$-2AB \qquad -2AB$$
$$A^2 + B^2 = C^2$$

Picture 2 – The equation and algebra used to prove $A^2+B^2=C^2$

Nick