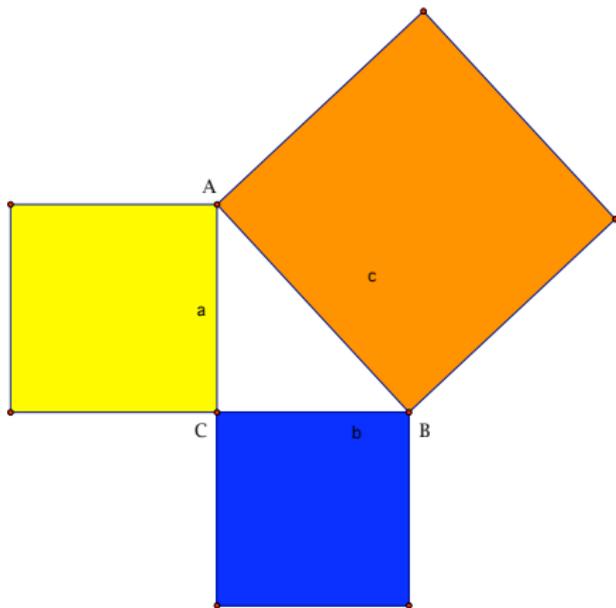# Theorem 9: (Pythagorean Theorem)
In a right triangle the sum of the squares of the legs equals the square of the hypotenuse.

Pythagorean
Theorem

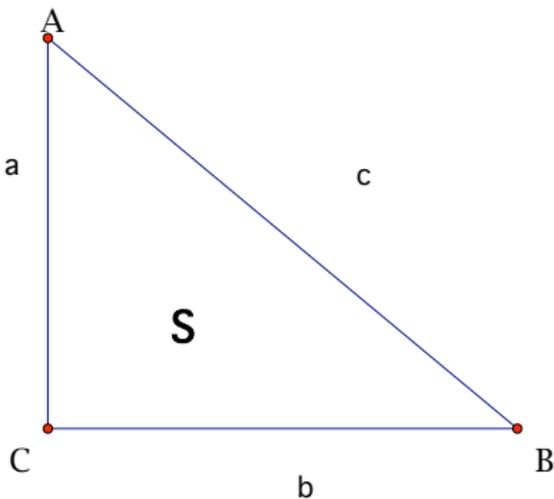**Note:** This is a statement about area:

Sketch of proof:

Let $\triangle ABC$ have $\angle BCA$ as a right angle. Let $a = AC$, $b = BC$, and $c = AB$. We need to show $a^2 + b^2 = c^2$. Let
$\mathbf{S} = \text{area}(\triangle ABC)$.

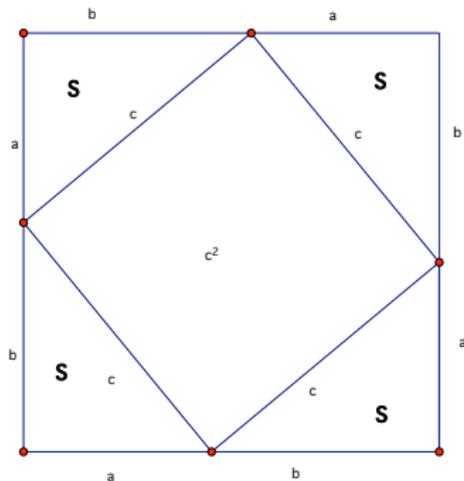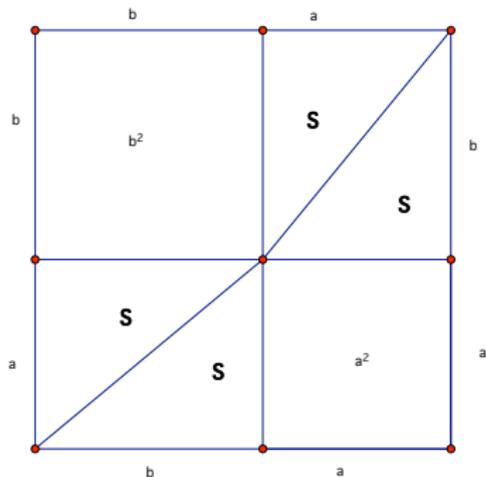# Sketch of proof:

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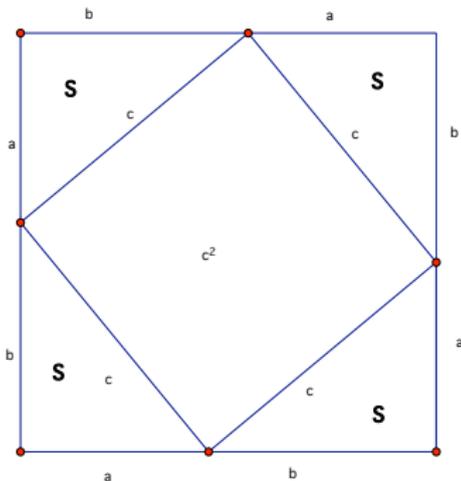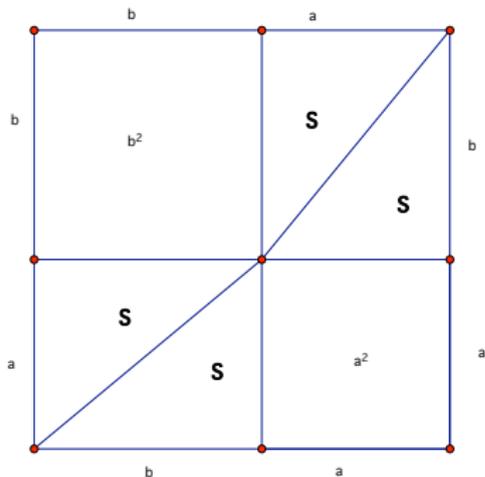
Consider a square of side $a + b$, and subdivide the square in two ways:

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On the left we see the area of the square is $a^2 + b^2 + 4\mathbf{S}$, while on the right we have the area as $c^2 + 4\mathbf{S}$. Thus, $a^2 + b^2 = c^2$. This is the claim. $\square$