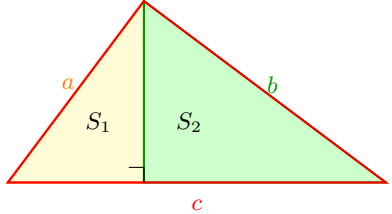
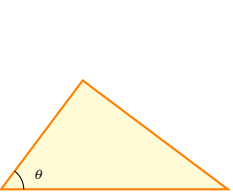
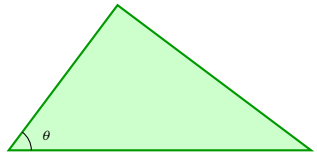
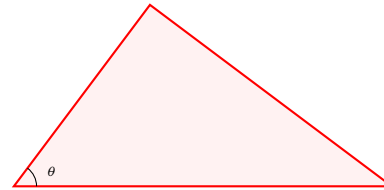


$$S = S_1 + S_2$$







S_1 S_2 S

Since the triangles are similar, their areas are proportional to the squares of their corresponding sides (the hypotenuses):

$S_1 = a^2 \cdot k$

$S_2 = b^2 \cdot k$

$S \ \ = c^2 \cdot k \quad$ where $k = \frac{1}{2} \cos\theta \sin\theta$

Substituting into $S = S_1 + S_2$:

$c^2 \cdot k = a^2 \cdot k + b^2 \cdot k$

$\Rightarrow \mathbf{c^2 = a^2 + b^2}$