

Proving the Fundamental Pythagorean Identity (5.9.4)

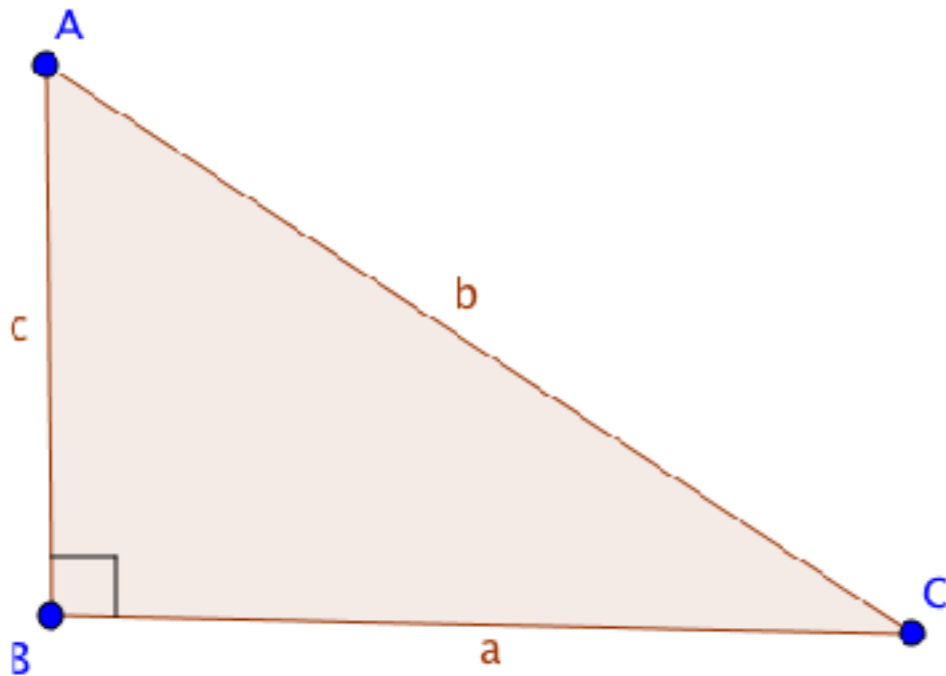
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Pythagorean Identity

$$\sin^2 \theta + \cos^2 \theta = 1$$

*Note: $\sin^2 \theta = (\sin \theta)^2$

Ex. 1: Prove the pythagorean identity $\sin^2 \theta + \cos^2 \theta = 1$ using the diagram below.



Other Trigonometric Identities

Reciprocal Identities:

$$\csc \theta = \frac{1}{\sin \theta}; \sec \theta = \frac{1}{\cos \theta}; \cot \theta = \frac{1}{\tan \theta}$$

Quotient Identities:

$$\tan \theta = \frac{\sin \theta}{\cos \theta}; \cot \theta = \frac{\cos \theta}{\sin \theta}$$

Ex. 2: Find the remaining 5 trigonometric ratios given that

$$\cos \theta = \frac{\sqrt{3}}{2} \quad \text{and} \quad 0^\circ \leq \theta < 90^\circ$$

Then find θ

Ex. 3: Use identities to simplify the following expression.

$$\frac{1 - \cos^2 \theta}{\cos \theta}$$