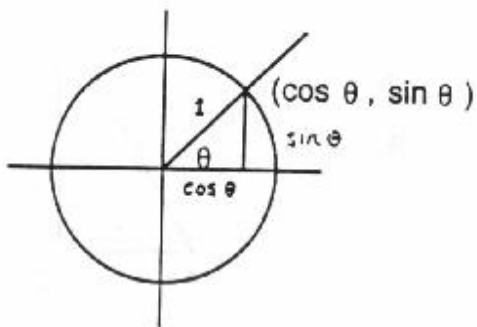


Pythagorean Identities

Using the unit circle definition of the trig functions we can label the legs and hypotenuse of a reference right triangle as follows:



Apply the Pythagorean Theorem to this right triangle to obtain:

Support this identity graphically by graphing $y = \sin^2 x + \cos^2 x$.

It is sometimes useful to derive two other identities from this Pythagorean Identity by (a) dividing each term by $\sin^2 x$ and simplifying the result using the Quotient and Reciprocal Identities, and (b) dividing each term by $\cos^2 x$ and simplifying the result using the Quotient and Reciprocal Identities. Use these procedures to derive two new identities:

(a)

(b)