

Verifying Trigonometric Identities

To verify that a trigonometric equation is an identity, we transform one side of the equation into the other side by a series of steps:

GUIDELINES FOR PROVING TRIGONOMETRIC IDENTITIES

- 1. Start with one side.** Pick one side of the equation and write it down. Your goal is to transform it into the other side. It's usually easier to start with the more complicated side.
- 2. Use known identities.** Use algebra and the identities you know to change the side you started with. Bring fractional expressions to a common denominator, factor, and use the fundamental identities to simplify expressions.
- 3. Convert to sines and cosines.** If you are stuck, you may find it helpful to rewrite all functions in terms of sines and cosines.

Warning: To verify an identity, we do not just perform the same operations on both sides of the equation. Only operations that are reversible will necessarily transform an identity into an identity.

Examples:

$$\cos \theta (\sec \theta - \cos \theta) = \sin^2 \theta$$

$$(\sin x + \cos x)^2 = 1 + 2 \sin x \cos x$$

$$\frac{\cos u \sec u}{\tan u} = \cot u$$