Simplify:

$$\csc x - \cos x \cot x$$

$$\frac{1}{\sin x} - \cos x \cdot \frac{\cos x}{\sin x}$$

$$\frac{1}{\sin x} - \frac{\cos^2 x}{\sin x}$$

$$\frac{1-\cos^2 x}{\sin x}$$

$$\frac{\sin^2 x}{\sin x}$$

$$\sin x$$

Bag of Tricks (see what you see)

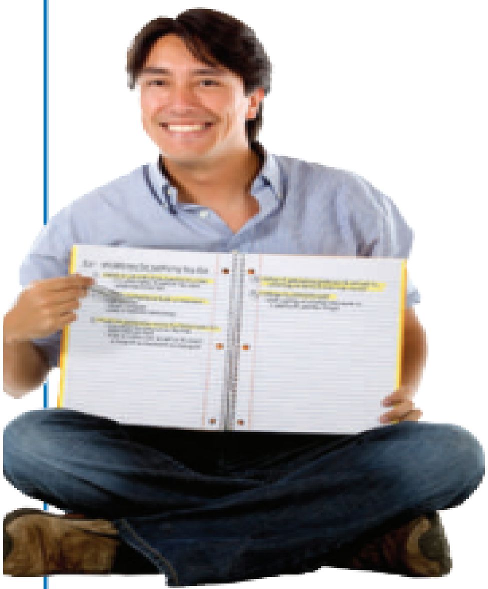
- rewrite in terms of sine and cosine
- are terms squared-maybe Pythagorean identities
- FOIL
- Factor
- write as one fraction *(common denominator)*
- multiply by conjugate

we just simplified, now we are going to

Verify

- The problem is **showing the steps...** making one side look EXACTLY like the other.
- The steps ARE the problem.
- You already know they are =

Guidelines for Verifying Trigonometric Identities



1. Work with one side of the equation at a time. It is often better to work with the more complicated side first.
2. Look for opportunities to factor an expression, add fractions, square a binomial, or create a monomial denominator.
3. Look for opportunities to use the fundamental identities. Note which functions are in the final expression you want. Sines and cosines pair up well, as do secants and tangents, and cosecants and cotangents.
4. When the preceding guidelines do not help, try converting all terms to sines and cosines.
5. Always try *something*. Even making an attempt that leads to a dead end provides insight.

Verify

$$2\sec^2\theta = \frac{1}{1-\sin\theta}\frac{(1+\sin\theta)}{(1+\sin\theta)} + \frac{1}{1+\sin\theta}\frac{(1-\sin\theta)}{(1-\sin\theta)}$$

$(1-\sin^2\theta)$

$$2\sec^2\theta = \frac{1+\sin\theta}{1-\sin^2\theta} + \frac{1-\sin\theta}{1-\sin^2\theta}$$

$$2\sec^2\theta = \frac{2}{1-\sin^2\theta}$$

$$2\sec^2\theta = \frac{2}{\cos^2\theta}$$

$$2\sec^2\theta = 2\sec^2\theta$$

$$\cos 2\theta + \sin^4\theta = \cos^4\theta$$

Tactivity
Ws

$$\qquad + \sin^4\theta = \cos^4\theta$$

$$\qquad \left(1 - \sin^2\theta\right) = \cos^4\theta$$

$$\qquad = \cos^4\theta$$

$$\qquad = \cos^4\theta$$

day 2

Verify

$$\tan x + \cot x = \sec x \csc x$$

Adding Fraction Example

conjugate example

Verify

$$\sec x + \tan x = \frac{\cos x}{1 - \sin x} \frac{(1+\sin x)}{(1+\sin x)}$$

$$\sec x + \tan x = \frac{\cos x(1+\sin x)}{1-\sin^2 x}$$

$$\sec x + \tan x = \frac{\cos x(1+\sin x)}{\cos^2 x}$$

$$\sec x + \tan x = \frac{1+\sin x}{\cos x}$$

$$\sec x + \tan x = \sec x + \tan x$$

Verify

$$(\sec\theta - \tan\theta)(\csc\theta + 1) = \cot\theta$$

$$\left(\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\sin\theta} + 1\right) = \cot\theta$$

$$\left(\frac{1-\sin\theta}{\cos\theta}\right)\left(\frac{1}{\sin\theta} + 1\right) = \cot\theta$$

$$\frac{1-\sin\theta}{\cos\theta\,\sin\theta} + \frac{1-\sin\theta\,(\sin\theta)}{\cos\theta\,(\sin\theta} = \cot\theta$$

$$\frac{1-\sin\theta}{\cos\theta\,\sin\theta} + \frac{\sin\theta - \sin^2\theta}{\cos\theta\,\sin\theta} = \cot\theta$$

$$\frac{1-\sin^2\theta}{\cos\theta\,\sin\theta} = \cot\theta$$

$$\frac{\cos^2\theta}{\cos\theta\,\sin\theta} = \cot\theta$$

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

$$\cot\theta = \cot\theta$$

Verify

$$\left(\sec^2 x - 1\right)\left(\sin^2 x - 1\right) = -\sin^2 x$$

$$(\tan^2 x)(-\cos^2 x) = -\sin^2 x$$

$$\frac{\sin^2 x}{\cos^2 x} \cdot -\frac{\cos^2 x}{1} = -\sin^2 x$$

$$-\sin^2 x = -\sin^2 y$$

Simplify: $\ln|\csc\theta| + \ln|\tan\theta|$

Use trigonometric substitution to write the algebraic function as a trig function.

$\sqrt{64-16x^2}$ $x = 2\cos\theta$

Summarize the major points of the lesson.

How do you verify a trigonometric identity.