

## Verifying Trig Identities

p. 54

- Simplify the left &/or the right side(s) of the equation until they are the same
- You CANNOT move from 1 side of the equation to the other (you aren't solving an equation)
- Show EVERY step! Assume I know nothing so you have to prove it to me.

$$1. \frac{\tan x \cos x}{\sin x} = 1$$

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

$$\frac{\sin x \cos x}{\cos x \sin x} = 1$$

$$\frac{\sin x}{\sin x} = 1$$

$$1 = 1$$

$$2. \frac{1 + \tan^2 x}{\csc^2 x} = \tan^2 x$$

$$\frac{\sec^2 x}{\csc^2 x} = \tan^2 x$$

$$\sec^2 x \div \csc^2 x = \tan^2 x$$

$$\frac{1}{\cos^2 x} \div \frac{1}{\sin^2 x} = \tan^2 x$$

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

$$\frac{\sin^2 x}{\cos^2 x} = \tan^2 x$$

$$\tan^2 x = \tan^2 x$$

$$3. \cos^2 x + \cos^2 x \tan^2 x = 1$$

$$\text{GCF } \cos^2 x (1 + \tan^2 x) = 1$$

$$\cos^2 x \cdot \sec^2 x = 1$$

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

$$\frac{\cos^2 x}{\cos^2 x} = 1$$

$$1 = 1$$

$$4. \frac{1}{\sec^2 x} + \frac{1}{\csc^2 x} = 1$$

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

$$1 = 1$$

$$5. \cos x (\csc x - \sec x) = \cot x - 1$$

$$\cos x \csc x - \cos x \sec x =$$

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

$$\frac{\cos x}{\sin x} - \frac{\cos x}{\cos x} =$$

$$\cot x - 1 = \cot x - 1$$

Distributive prop

$$6. \tan x = \frac{\cos x}{\sin x \cot^2 x}$$

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

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

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

$$= \cos x \div \frac{\cos^2 x}{\sin x}$$

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

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

$$= \frac{\sin x}{\cos x}$$

$$\tan x = \tan x$$

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

$$7. \cot x \sec x \csc^2 x - \cot^3 x \sec x = \csc x$$

$$\cot x \sec x (\csc^2 x - \cot^2 x) = \csc x$$

$$\cot x \sec x (1) = \csc x$$

$$\frac{\cos x}{\sin x} \cdot \frac{1}{\cos x} = \csc x$$

$$\frac{\cos x}{\sin x \cos x} = \csc x$$

$$\frac{1}{\sin x} = \csc x$$

$$\csc x = \csc x$$

GCF!

$$8. \frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$$

$$\sin x \div \frac{1}{\sin x} + \cos x \div \frac{1}{\cos x} = 1$$

$$\sin x \cdot \sin x + \cos x \cdot \cos x = 1$$

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

$$1 = 1$$