## Worksheet: Verifying Trigonometric Identities

**Verify each identity below.**

1. $\cos x + \sin x \tan x = \sec x$

$$\cos x + \sin x \cdot \frac{\sin x}{\cos x}$$

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

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

2. $\sec x - \cos x = \tan x \sin x$

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

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

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

3. $\tan x \csc x \cos x = 1$

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

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

4. $\sin^2\theta(1+\cot^2\theta)=1$

$\sin^2\theta + \sin^2\theta\cot^2\theta$

$\sin^2\theta + \sin^2\theta \cdot \frac{\cos^2\theta}{\sin^2\theta}$

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

or

$\sin^2\theta(\csc^2\theta)$

$\sin^2\theta \cdot \frac{1}{\sin^2\theta}$

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

5. $\frac{1}{\sin t-1}+\frac{1}{\sin t+1}=-2\tan t\sec t$

$= \frac{1(\sin t+1)+1(\sin t-1)}{(\sin t-1)(\sin t+1)}$

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

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

$-2\tan t\sec t$

6. $\frac{\sin t}{\csc t}+\frac{\cos t}{\sec t}=1$

$\frac{\sin t}{1/\sin t} + \frac{\cos t}{1/\cos t}$

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