

## Proving Trig Identities Worksheet

Prove the following identities using proper form and showing all steps:

1.  $\cot x = \csc x \cos x$
2.  $\cot x \sin x = \cos x$
3.  $\frac{\tan x}{\sec x} = \sin x$
4.  $\tan x \cos x = \sin x$
5.  $\frac{\cot x}{\csc x} = \cos x$
6.  $\sin x \sec x = \tan x$
7.  $\tan x \csc x = \sec x$
8.  $\sec x(1 + \cos x) = 1 + \sec x$
9.  $\sin x(1 + \csc x) = \sin x + 1$
10.  $\tan x(1 + \cot x) = 1 + \tan x$
11.  $\cos x(\sec x + 1) = \cos x + 1$
12.  $\csc y(\sin y - 1) = 1 - \csc y$
13.  $\cot z(1 - \tan z) = \cot z - 1$
14.  $\sin y \tan^2 y \cot^3 y = \cos y$
15.  $\sin^2 x \sec^2 x = \sec^2 x - 1$
16.  $(1 + \tan^2 x) \cos^2 x = 1$
17.  $(1 + \tan y)^2 - \sec^2 y = 2 \tan y$
18.  $(\cos x - \sin x)^2 = 1 - 2 \sin x \cos x$
19.  $(\sin y + \cos y)(\sin y - \cos y) = 1 - 2 \cos^2 y$
20.  $\frac{\tan^2 x - 1}{\cot^2 x - 1} = 1 - \sec^2 x$
21.  $\frac{1}{1 + \tan^2 y} + \frac{1}{1 + \cot^2 y} = 1$
22.  $\frac{\tan^2 z}{1 + \tan^2 z} = \sin^2 z$
23.  $\frac{1 + \cos x}{1 - \cos x} = 1 + \frac{2 \cos x(1 + \cos x)}{\sin^2 x}$
24.  $\frac{\sec z}{\csc^2 z} = \sec z - \cos z$
25.  $\csc^2 y - \csc y \cot y = \frac{1}{1 + \cos y}$
26.  $\frac{1 + \sin^2 x \sec^2 x}{1 + \cos^2 x \csc^2 x} = \sin^2 x \sec^2 x$
27.  $2 + \frac{\sin^4 y + \cos^4 y}{\sin^2 y \cos^2 y} = \sec^2 y \csc^2 y$
28.  $(1 + \tan^2 z) \cos^2 z = 1$
29.  $(1 - \cos^2 x)(1 + \tan^2 x) = \tan^2 x$
30.  $\sin^2 x \sec^2 x = \sec^2 x - 1$
31.  $\frac{\sin y + \cos y}{\sec y + \csc y} = \frac{\cos y}{\csc y}$
32.  $\cos t + \sin t = \frac{1 + \tan t}{\sec t}$
33.  $\frac{1}{1 - \sec x} + \frac{1}{1 + \sec x} = -2 \cot^2 x$
34.  $\frac{(\sin x + \cos x)^2}{(\sin x - \cos x)^2} = \frac{\sec^2 x + 2 \tan x}{\sec^2 x - 2 \tan x}$
35.  $\frac{1 - \cos^2 x}{\sin x} = \sin x$
36.  $1 + \frac{1}{\tan^2 x} = \frac{1}{\sin^2 x}$
37.  $\frac{1}{\cos x} - \cos x = \sin x \tan x$
38.  $\left(1 + \frac{1}{\tan^2 x}\right)(1 - \cos^2 x) = 1$
39.  $\frac{1}{\cos^2 x} = 1 + \tan^2 x$
40.  $\cos^2 x + \frac{\sin x \cos x}{\tan x} = 2 \cos^2 x$
41.  $(1 - \cos^2 x)(1 + \tan^2 x) = \tan^2 x$
42.  $\frac{\sin x}{1 - \cos x} - \frac{1 + \cos x}{\sin x} = 0$