

In Problems 1 through 34, prove that each equation is an identity.

1.  $\sec x(\sec x - \cos x) = \tan^2 x$
2.  $\tan x(\cot x + \tan x) = \sec^2 x$
3.  $\sin x(\csc x - \sin x) = \cos^2 x$
4.  $\cos x(\sec x - \cos x) = \sin^2 x$
5.  $\csc^2 \theta - \cos^2 \theta \csc^2 \theta = 1$
6.  $\cos^2 \theta + \tan^2 \theta \cos^2 \theta = 1$
7.  $(\sec \theta + 1)(\sec \theta - 1) = \tan^2 \theta$
8.  $(1 + \sin \theta)(1 - \sin \theta) = \cos^2 \theta$
9.  $\sec^2 A + \tan^2 A \sec^2 A = \sec^4 A$
0.  $\cot^2 A \csc^2 A - \cot^2 A = \cot^4 A$
1.  $\cos^4 t - \sin^4 t = 1 - 2 \sin^2 t$
2.  $\sec^4 t - \tan^4 t = 1 + 2 \tan^2 t$
3.  $\frac{\sin x \cos x}{\cos x} - \frac{\sin x \cos x}{\sin x} = \tan x$
4.  $\frac{\sec x}{\sin x} - \frac{\sin x}{\cos x} = \cot x$
5.  $\frac{\sin x}{\cos x} + \frac{\sec x}{\cos x} = 1$
6.  $\frac{\sec^2 x}{1} + \frac{\csc^2 x}{1} = 1$
7.  $\frac{1 + \cos s}{1} = \csc^2 s - \csc s \cot s$
8.  $\frac{1 - \sin r}{1} = \sec^2 r + \sec r \tan r$
9.  $\frac{\cos x}{\cos x} - \frac{\tan^2 x}{\cos x} = \cot^2 x$
20.  $\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} = 2 \csc x$
21.  $\frac{\sec x}{\sec x} = \sec^2 x + \sec x \tan x$
22.  $\frac{1 + \sin x}{1 - \sin x} = 2 \sec^2 x + 2 \sec x \tan x - 1$
23.  $\sin^2 z \cos^2 z = \sin^3 z - \sin^5 z$
24.  $\sin^2 z \cos^2 z = \cos^2 z - \sin^2 z$
25.  $\sec^2 \theta + \csc^2 \theta = \sec^2 \theta \csc^2 \theta$
26.  $\sec \theta + \tan \theta = \frac{\sec \theta - \tan \theta}{1}$
27.  $\frac{1 - 3 \cos x - 4 \cos^2 x}{1 - \cos x} = \frac{\sin^2 x}{1 - \cos x}$
28.  $\frac{\sec^2 x - 6 \tan x + 7}{\tan x - 4} = \frac{\sec^2 x - 5}{\tan x + 2}$
29.  $\frac{\sin^3 A + \cos^3 A}{\sin A + \cos A} = 1 - \sin A \cos A$
30.  $\frac{\sec^3 B - \cos^3 B}{\sec^2 B - \cos^2 B} = \sec^2 B + 1 + \cos^2 B$
31.  $\csc^6 x - \cot^6 x = 1 + 3 \csc^2 x \cot^2 x$
32.  $(2 \sin x + 3 \cos x)^2 + (3 \sin x - 2 \cos x)^2 = 13$
33.  $\frac{1 + \sin x + \cos x}{1 + \cos x} = \frac{\sin x}{1 + \sin x}$
34.  $\frac{1 - \sin x + \cos x}{1 + \sin x + \cos x} = \frac{\cos x}{1 + \sin x}$

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5.  $\csc^2 \theta - \cos^2 \theta \csc^2 \theta = 1$
6.  $\cos^2 \theta + \tan^2 \theta \cos^2 \theta = 1$
7.  $(\sec \theta + 1)(\sec \theta - 1) = \tan^2 \theta$
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9.  $\sec^2 A + \tan^2 A \sec^2 A = \sec^4 A$
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9.  $\frac{\cos x}{\cos x} - \frac{\tan^2 x}{\cos x} = \cot^2 x$
0.  $\frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} = 2 \csc x$
1.  $\frac{\sec x - \tan x}{\sec x} = \sec^2 x + \sec x \tan x$
2.  $\frac{1 + \sin x}{1 - \sin x} = 2 \sec^2 x + 2 \sec x \tan x - 1$
3.  $\sin^2 z \cos^2 z = \sin^3 z - \sin^5 z$
4.  $\sin^2 z \cos^2 z = \cos^2 z - \cos^4 z$
5.  $\sin^2 z + \cos^2 z = \sin^2 z + \cos^2 z$
6.  $\sec^2 \theta + \csc^2 \theta = \sec^2 \theta \csc^2 \theta$
7.  $\sec \theta + \tan \theta = \frac{\sec \theta - \tan \theta}{1}$
8.  $1 - 3 \cos x - 4 \cos^2 x = \frac{\sin^2 x}{1 - \cos x}$
9.  $\frac{\sec^2 x - 6 \tan x + 7}{\tan x - 4} = \frac{\tan x + 2}{\tan x - 5}$
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6.  $\frac{1 - \sin x + \cos x}{1 + \sin x + \cos x} = \frac{1 - \sin x}{\cos x}$