

Verify each identity.

1.  $\tan^2 x - \tan^2 x \sin^2 x = \sin^2 x$

$$\tan^2 x (1 - \sin^2 x)$$

$$\tan^2 x \cdot \cos^2 x$$

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

$$\sin^2 x$$



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

$$\frac{(\cancel{\sec x - 1})(\sec x + 1)}{\cancel{\sec x - 1}}$$

$$\sec x + 1$$



3.  $\tan^4 x + 2 \tan^2 x + 1 = \sec^4 x$

$$(\tan^2 x + 1)(\tan^2 x + 1)$$

$$\sec^2 x \cdot \sec^2 x$$

$$\sec^4 x$$



4.  $\sin^4 x - \cos^4 x = \sin^2 x - \cos^2 x$

$$(\sin^2 x - \cos^2 x)(\sin^2 x + \cos^2 x)$$

$$(\sin^2 x - \cos^2 x) \cdot 1$$

$$\sin^2 x - \cos^2 x$$



5.  $(\sin x + \cos x)^2 = 2 \sin x \cos x + 1$

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

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



6.  $(3 - 3 \sin x)(3 + 3 \sin x) = 9 \cos^2 x$

$$9 - 9 \sin^2 x$$

$$9(1 - \sin^2 x)$$

$$9 \cos^2 x$$



$$7. \frac{1}{1+\cos x} + \frac{1}{1-\cos x} = 2 \csc^2 x$$

$$\frac{1-\cos x + 1+\cos x}{(1+\cos x)(1-\cos x)}$$

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

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

$$2 \csc^2 x$$

$$8. \tan x - \frac{\sec^2 x}{\tan x} = -\cot x$$

$$\frac{\tan^2 x - \sec^2 x}{\tan x}$$

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

$$-\cot x$$

$$9. \frac{\sin^2 y}{1-\cos y} = 1+\cos y$$

$$\frac{\sin^2 y \cdot (1+\cos y)}{1-\cos y \cdot (1+\cos y)}$$

$$\frac{\sin^2 y (1+\cos y)}{1-\cos^2 y}$$

$$\frac{\sin^2 y (1+\cos y)}{\sin^2 y}$$

$$1+\cos y$$

$$10. \frac{\tan^2 x}{\csc x + 1} = \tan^4 x (\csc x - 1)$$

$$\frac{\tan^2 x \cdot (\csc x - 1)}{\csc x + 1 \cdot (\csc x - 1)}$$

$$\frac{\tan^2 x (\csc x - 1)}{\csc^2 x - 1}$$

$$\frac{\tan^2 x (\csc x - 1)}{\cot^2 x}$$

$$\frac{\tan^2 x (\csc x - 1)}{1}$$

$$\tan^2 x (\csc x - 1)$$

$$11. \frac{\sin(-x)}{\cos x} = -\tan x$$

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

$$-\tan x$$

$$12. \frac{\cos^2 y}{1-\sin y} = 1+\sin y$$

$$\frac{\cos^2 y \cdot (1+\sin y)}{1-\sin y \cdot (1+\sin y)}$$

$$\frac{\cos^2 y (1+\sin y)}{1-\sin^2 y}$$

$$\frac{\cos^2 y (1+\sin y)}{\cos^2 y}$$

$$1+\sin y$$