

Simplify.

1) $\frac{\sin x}{1 + \cos x} + \cot x$

2) $\frac{\sin \theta}{\cos \theta + 1} + \frac{\cos \theta - 1}{\sin \theta}$

3) $\frac{\cos^2 x - \sin^2 x}{1 - \tan^2 x}$

Verify the identity.

4) $\frac{\tan x - \sin(-x)}{1 + \cos x} = \tan x$

5) $\frac{\csc^2 x - 1}{\csc^2 x} = \cos^2 x$

6) $\sec x - \tan x = \frac{1 - \sin x}{\cos x}$

7) $\frac{\sin x + \cos x}{\sin x} - \frac{\cos x - \sin x}{\cos x} = \sec x \csc x$

$$8) \tan\left(\frac{\pi}{2} - \theta\right) \sec \theta = \csc \theta$$

$$9) \frac{\cos(-x)}{1 + \sin(-x)} = \sec x + \tan x$$

$$10) \csc^4 x - 2 \csc^2 x + 1 = \cot^4 x$$

$$11) \frac{\sec \theta \sin \theta}{\tan \theta + \cot \theta} = \sin^2 \theta$$

$$12) \frac{\sec \theta}{\cos \theta} - \frac{\tan \theta}{\cot \theta} = 1$$

$$13) \frac{1 + \sec(-x)}{\sin(-x) + \tan(-x)} = -\csc x$$