

## 5.2 Proving Trig Identities - Extra Practice

Wednesday, March 1, 2017 1:29 PM

$$\textcircled{1} \tan x \frac{1}{\cot x} = \tan^2 x$$

$$\tan x \cdot \tan x =$$

$$\tan^2 x = \tan^2 x \checkmark$$

$$\textcircled{2} (1 - \cos x)(1 + \cos x) = \sin^2 x$$

$$1 - \cos^2 x = \sin^2 x$$

$$\sin^2 x = \sin^2 x \checkmark$$

$$\textcircled{3} \cos^2 x \csc x \sec x = \cot x$$

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

$$\frac{\cos^2 x}{\sin x \cancel{\cos x}} =$$

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

$$\cot x = \cot x \checkmark$$

$$\textcircled{4} (1 - \cos^2 \theta) \cot \theta = \sin \theta \cos \theta$$

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

$$\frac{\sin^2 \theta \cos \theta}{\cancel{\sin \theta}} =$$

$$\sin \theta \cos \theta = \sin \theta \cos \theta \checkmark$$

$$\textcircled{5} \frac{\sin x}{\cancel{\sin x} \cdot \cos x} + \frac{\cos x \cdot \cancel{\cos x}}{\sin x \cdot \cancel{\cos x}} = \frac{\csc x}{\cos x}$$

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

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

$$\frac{\csc x}{\cos x} = \frac{\csc x}{\cos x} \checkmark$$

$$\textcircled{6} \tan \theta \csc \theta \cos \theta = 1$$

$$\frac{\cancel{\sin \theta}}{\cancel{\cos \theta}} \cdot \frac{1}{\cancel{\sin \theta}} \cdot \cancel{\cos \theta} =$$

$$1 = 1 \checkmark$$

$$\textcircled{7} (\sin x - \cos x)^2 = 1 - 2\sin x \cos x$$

$$\underbrace{\sin^2 x} - 2\sin x \cos x + \underbrace{\cos^2 x} =$$

$$1 - 2\sin x \cos x = 1 - 2\sin x \cos x \checkmark$$

$$\textcircled{8} \frac{\cancel{\sin x} \cdot \csc x}{\cancel{\sin x} \cdot \cos x} - \frac{\cos x \cdot \cancel{\cos x}}{\sin x \cdot \cancel{\cos x}} = \tan x$$

$$\frac{\sin x \cdot \csc x - \cos^2 x}{\sin x \cos x} =$$

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

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

$$\tan x = \tan x \checkmark$$

$$\textcircled{9} \csc x - \sin x = \cot x \cos x$$

$$\frac{1}{\sin x} - \sin x \cdot \sin x =$$

$$\textcircled{10} \cot x (\tan x \sin x + \cos x) = \csc x$$

$$\cot x \cdot \tan x \cdot \sin x + \cot x \cos x =$$

$$(9) \csc x - \sin x = \cot x \cos x$$

$$\frac{1}{\sin x} - \sin x \cdot \frac{\sin x}{\sin x} =$$

$$\frac{1 - \sin^2 x}{\sin x} =$$

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

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

$$\cot x \cos x = \cot x \cos x \checkmark$$

$$(10) \cot x (\tan x \sin x + \cos x) = \csc x$$

$$\cot x \tan x \sin x + \cot x \cos x =$$

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

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

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

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

$$\csc x = \csc x \checkmark$$

$$(11) (1 + \sin x)(1 - \sin x) = \cos^2 x$$

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

$$\cos^2 x = \cos^2 x \checkmark$$

$$(12) \csc x - \sin x = \cos x \cot x$$

$$\frac{1}{\sin x} - \sin x \cdot \frac{\sin x}{\sin x} =$$

$$\frac{1 - \sin^2 x}{\sin x} =$$

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

$$\cos x \cot x = \cos x \cot x \checkmark$$

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

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

$$1 = 1 \checkmark$$

$$(14) \frac{1 + \sin x}{(1 - \sin x) \cos x} = \frac{\cos x}{1 - \sin x}$$

$$\frac{1 - \sin^2 x}{(1 - \sin x) \cos x} =$$

$$\frac{\cos^2 x}{(1 - \sin x) \cos x} =$$

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

$$(15) \frac{\csc^2 x}{\cot^2 x} = 1 + \tan^2 x$$

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

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

$$(16) \frac{\sec^2 x - 1}{\sin^2 x} = \sec^2 x$$

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

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

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

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

Pyth. Id.  $\sec^2 x = 1 + \tan^2 x = 1 + \tan^2 x$

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

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

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

$$\sec^2 x = \sec^2 x \checkmark$$

$$(17) \tan^2 x - \sin^2 x = \sin^2 x \tan^2 x$$

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

$$\frac{\sin^2 x - \sin^2 x \cos^2 x}{\cos^2 x} =$$

$$\frac{\sin^2 x (1 - \cos^2 x)}{\cos^2 x} =$$

$$\frac{\sin^2 x (\sin^2 x)}{\cos^2 x} =$$

$$\sin^2 x \tan^2 x = \sin^2 x \tan^2 x \checkmark$$

$$(18) \frac{1 - \sin^2 x}{\csc x - \sin x} = \sin x$$

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

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

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

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

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

$$\sin x = \sin x \checkmark$$

$$(19) \frac{\sec x - \cos x}{\cos x} = \tan^2 x$$

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

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

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

$$(20) \frac{\cancel{\sin t} \cdot \sin t}{\cancel{\sin t} (1 - \cos t)} + \frac{1 + \cos t \cdot \frac{1 - \cos t}{1 - \cos t}}{\sin t \cdot \frac{1 - \cos t}{1 - \cos t}} = \frac{2(1 + \cos t)}{\sin t}$$

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

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

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

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

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

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

$$\tan^2 x = \tan^2 x \checkmark$$

$$\frac{2(1-\cos t)}{\sin t(1-\cos t)} =$$

$$\frac{2(1+\cos t)(1-\cos t)}{\sin t(1-\cos t)} =$$

$$\frac{2(1+\cos t)}{\sin t} = \frac{2(1+\cos t)}{\sin t} \checkmark$$