

* answers may vary!

Name: Key

Date: _____ Period: _____

Verify each of the following identities.

1. $\tan x + 1 = \sin x(\sec x + \csc x)$

$$\begin{aligned} & \sin x \sec x + \sin x \csc x \\ & \frac{\sin x \cdot 1}{1 \cdot \cos x} + \frac{\sin x}{1} \cdot \frac{1}{\sin x} \\ & \frac{\sin x}{\cos x} + 1 \end{aligned}$$

$$\tan x + 1 = \tan x + 1$$

2. $\csc^2 x - \sin^2 x - \cos^2 x = \cot^2 x$

$$\begin{aligned} & \csc^2 x - (\sin^2 x + \cos^2 x) = \\ & \csc^2 x - 1(1) = \\ & \csc^2 x - 1 = \\ & \cot^2 x = \cot^2 x \end{aligned}$$

3. $\frac{\overset{\text{cost}}{\cos x}}{1 + \sin x} + \frac{\overset{(1+\sin x)}{\sin x}}{\cos x} = \sec x$

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

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

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

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

$$\sec x = \sec x$$

4. $\frac{7 \csc^2 x + \csc x - 8}{\cot^2 x} = \frac{7 \csc x + 8}{\csc x + 1}$

$$\frac{(7 \csc x + 8)(\csc x - 1)}{\csc^2 x - 1}$$

$$\frac{(7 \csc x + 8)(\csc x - 1)}{(\csc x - 1)(\csc x + 1)}$$

$$\frac{7 \csc x + 8}{\csc x + 1} = \frac{7 \csc x + 8}{\csc x + 1}$$

$$5. \frac{1 + \tan^2 x}{1 - \sin^2 x + \cos^2 x} = \frac{1}{2 \cos^2 x}$$

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

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

$$\frac{\sec^2 x}{2 \cos^2 x}$$

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

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

$$\frac{1}{2 \cos^4 x} = \frac{1}{2 \cos^4 x}$$

$$7. \frac{\tan x - \tan x \sin^2 x}{\csc x \sec x} = \frac{1}{\csc x \sec x}$$

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

$$\tan x (\cos^2 x)$$

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

$$\sin x \cos x$$

$$\frac{1}{\csc x} \cdot \frac{1}{\sec x}$$

$$\frac{1}{\csc x \sec x} = \frac{1}{\csc x \sec x}$$

$$6. \sec x + \sin x = \frac{1 + \sin x \cos x}{\cos x} =$$

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

$$\sec x + \sin x = \sec x + \sin x$$

$$8. \cos x (\tan x + \sin x \cot x) = \sin x + \cos^2 x$$

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

$$\frac{\cos x}{1} \cdot \frac{\sin x}{\cos x} + \frac{\cos x}{1} \cdot \frac{\sin x}{1} \cdot \frac{\cos x}{\sin x}$$

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