

* Answers may vary

Name: Key

Date: _____ Period: _____

Verify each of the following identities.

$$1. \frac{\sin^2 x - \sin x}{\sin x \cos x + 1} + \frac{\cos x - 1}{\sin x (\cos x + 1)} = 0$$

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

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

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

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

$$\frac{0}{\sin x (\cos x + 1)} =$$

$$3. \sec^2 x + \cot x = \frac{\sin x + \cos^3 x}{\cos^2 x \sin x}$$

$$\frac{\sin x}{\cos^2 x \sin x} + \frac{\cos^3 x}{\cos^2 x \sin x}$$

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

$$\sec^2 x + \cot x = \sec^2 x + \cot x$$

$$2. \sec x \csc x = \tan x + \cot x$$

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

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

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

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

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

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

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

$$4. \frac{\sec x}{\cos x} - \frac{\tan x}{\cot x} = 1$$

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

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

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

$$\sec^2 x - \tan^2 x =$$

$$1 = 1$$

$$5. \frac{-1}{\tan x - \sec x} + \frac{-1}{\tan x + \sec x} = 2 \tan x$$

$\tan x + \sec x$
 $\tan x - \sec x$

$$\frac{-\tan x - \sec x}{(\tan x - \sec x)(\tan x + \sec x)} + \frac{-\tan x + \sec x}{(\tan x - \sec x)(\tan x + \sec x)} =$$

$$\frac{-\tan x - \sec x + -\tan x + \sec x}{(\tan x - \sec x)(\tan x + \sec x)} =$$

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

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

* $\sec^2 x - \tan^2 x$ *

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

$$\frac{-2 \tan x}{-1} =$$

$$2 \tan x = 2 \tan x$$

$$6. \frac{\cot x}{\cos x} + \frac{\sec x}{\cot x} = \sec^2 x \csc x$$

$$\frac{\cot^2 x}{\cos x \cot x} + \frac{\sec x \cos x}{\cos x \cot x} =$$

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

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

$$\frac{\csc^2 x}{\cos x \cot x} =$$

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

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

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

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

$$\csc x \cdot \sec^2 x = \csc^2 x \sec^2 x$$