

Honors Algebra II/Trig

8.6 Day 2 Worksheet

Name: Key

Prove the trig identity.

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

$$\begin{aligned} \sec^2 x (1 + \tan^2 x) &= \\ \sec^2 x \cdot \sec^2 x &= \\ \sec^4 x &= \sec^4 x \checkmark \end{aligned}$$

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

$$\begin{aligned} (\sec^2 x + \tan^2 x)(\sec^2 x - \tan^2 x) &= \\ (\sec^2 x + \tan^2 x) \cdot 1 &= \\ \tan^2 x + 1 + \tan^2 x &= \\ 1 + 2 \tan^2 x &= 1 + 2 \tan^2 x \checkmark \end{aligned}$$

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

$$\begin{aligned} \frac{\sin x}{1} \cdot \frac{\sin x}{1} + \frac{\cos x}{1} \cdot \frac{\cos x}{1} &= 1 \\ \sin^2 x + \cos^2 x &= 1 \\ 1 &= 1 \checkmark \end{aligned}$$

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

$$\begin{aligned} \frac{1+\sin x}{1-\sin^2 x} &= \\ \frac{1+\sin x}{\cos^2 x} &= \\ \frac{1}{\cos^2 x} + \frac{\sin x}{\cos x \cdot \cos x} &= \\ \sec^2 x + \sec x \tan x &= \sec^2 x + \sec x \tan x \checkmark \end{aligned}$$

$$5. \frac{(\sec x + \tan x) \sec x}{(\sec x + \tan x)(\sec x - \tan x)} = \sec^2 x + \sec x \tan x$$

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

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

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

$$6. \sin^3 x \cos^2 x = \cos^2 x \sin x - \cos^4 x \sin x$$

$$\sin x \cos^2 x (\sin^2 x) =$$

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

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

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

$$7. \frac{1 - 3\cos x - 4\cos^2 x}{\sin^2 x} = \frac{1 - 4\cos x}{1 - \cos x}$$

$$\frac{1 - 3\cos x - 4\cos^2 x}{1 - \cos^2 x} =$$

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

$$\frac{1 - 4\cos x}{1 - \cos x} = \frac{1 - 4\cos x}{1 - \cos x} \checkmark$$