

Name \_\_\_\_\_

Date \_\_\_\_\_

## Practice 8.2b: Verifying Trig Identities

Verify the following Trig IDs. Show your work

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

2.  $\frac{\cos(90^\circ - \alpha)}{\sin(90^\circ - \alpha)} = \tan \alpha$

3.  $\cos(90^\circ - \theta) \csc \theta = 1$

4.  $\frac{\csc(-\sigma)}{\sec(-\sigma)} = -\cot \sigma$

5.  $\frac{1}{\csc^2 x} + \frac{1}{\sec^2 x} = 1$

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

$$\frac{\frac{1}{\cos x} - 1}{1 - \cos x} \cdot \frac{\cos x}{\cos x} = \frac{1 - \cos x}{(1 - \cos x)\cos x} = \frac{1}{\cos x} = \sec x$$

7.  $\csc x - \sin x = \cos x \cot x$

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

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

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

9.  $\frac{\cos \theta \cot \theta}{1 - \sin \theta} - 1 = \csc \theta$

$$10. \cos x - \frac{\cos x}{1 - \tan x} = \frac{\sin x \cdot \cos x}{\sin x - \cos x}$$

$$11. 2\sec^2 x - 2\sec^2 x \sin^2 x - \sin^2 x - \cos^2 x = 1$$

$$12. \csc x(\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x = \csc^2 x$$

$$13. 2 + \cos^2 x - 3\cos^4 x = \sin^2 x(2 + 3\cos^2 x)$$

$$14. \sec^4 \theta - \tan^4 \theta = 1 + 2\tan^2 \theta$$

$$15. \frac{\sin x}{1 - \cos x} = \frac{1 + \cos x}{\sin x}$$

$$16. \sqrt{\frac{1 + \sin x}{1 - \sin x}} = \frac{1 + \sin x}{|\cos x|}$$

**Extra Credit.**  $\frac{\sin x \cdot \cos y + \cos x \cdot \sin y}{\cos x \cdot \cos y - \sin x \cdot \sin y} = \frac{\tan x + \tan y}{1 - \tan x \cdot \tan y}$