

2.1 Verifying Trig. Identities

1. $\sin x \sec x = \tan x$

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

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

$$= \tan x \checkmark$$

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

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

$$= \frac{1}{\sin x} - \frac{\sin x \left(\frac{\sin x}{\sin x} \right)}{\sin x}$$

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

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

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

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

2. $\cot(-x) \sin x = -\cos x$

$$= -\cot x \sin x$$

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

$$= -\cos x \checkmark$$

3. $\tan x \csc x \cos x = 1$

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

$$= 1 \checkmark$$

7. $\tan \theta \cot \theta = \sin \theta$

$$\csc \theta$$

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

$$\csc \theta$$

$$= 1$$

$$\csc \theta$$

$$= \sin \theta \checkmark$$

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

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

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

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

$$\sin x$$

$$= \sin x \checkmark$$

8. $\cos \theta \sec \theta = \tan \theta$

$$\cot \theta$$

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

$$\cot \theta$$

$$= \frac{1}{\cot \theta}$$

$$= \tan \theta \checkmark$$

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

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

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

$$9. \frac{\sec^2 \theta}{\tan \theta} = \sec \theta \csc \theta$$

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

$$\frac{\sin \theta}{\cos \theta}$$

$$= \frac{1}{\cos^2 \theta} \cdot \cos \theta$$

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

$$= \sec \theta \csc \theta$$

$$19. \frac{\sin \theta}{\csc \theta} + \frac{\cos \theta}{\sec \theta} = 1$$

$$= \sin \theta \cdot \frac{1}{\csc \theta} + \cos \theta \cdot \frac{1}{\sec \theta}$$

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

$$= 1$$