

Trigonometric Verifications

Verify each identity.

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

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

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

$$1 = 1$$

✓

3. $\sin \theta + \cos \theta \cot \theta = \csc \theta$

$$\sin \theta + \cos \theta \left(\frac{\cos \theta}{\sin \theta} \right) = \csc \theta$$

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

$$\frac{\sin^2 \theta}{\sin \theta} + \frac{\cos^2 \theta}{\sin \theta} = \csc \theta$$

$$\frac{\sin^2 \theta + \cos^2 \theta}{\sin \theta} = \csc \theta$$

$$\frac{1}{\sin \theta} = \csc \theta$$

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

✓

5. $\cos x \csc x = \cot x$

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

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

$$\cot x = \cot x$$

✓

P. 324: 1-17 odd,
 P. 342: 47

2. $\cos \theta \sec \theta - \cos^2 \theta = \sin^2 \theta$

$$\cancel{\cos \theta} \left(\frac{1}{\cancel{\cos \theta}} \right) - \cos^2 \theta = \sin^2 \theta$$

$$1 - \cos^2 \theta = \sin^2 \theta$$

$$\sin^2 \theta = \sin^2 \theta$$

✓

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

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

$$\sin x \cdot \sin x + \cos x \cdot \cos x = 1$$

$$\sin^2 x + \cos^2 x = 1$$

$$1 = 1$$

✓

6. $\frac{\sec^2 \theta - 1}{\sin^2 \theta} = \sec^2 \theta$

$$\frac{\tan^2 \theta}{\sin^2 \theta} = \sec^2 \theta$$

$$\frac{\sin^2 \theta}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta}{\cos^2 \theta} = \sec^2 \theta$$

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

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

$$\sec^2 \theta = \sec^2 \theta$$