

Worksheet 7.2E Verify each identity.

$$1) \frac{\sin x}{\cos^2 x} = \frac{\sec x}{\cot x}$$

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

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

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

$$2) \frac{\sin x}{\sec^2 x} = \frac{\cos^2 x}{\csc x}$$

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

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

$$\cos^2 x \sin x = \cos^2 x \cdot \sin x \quad \checkmark$$

$$3) \frac{\tan^2 x}{\cos^2 x} = \frac{\sec^2 x}{\cot^2 x}$$

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

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

$$\frac{\tan^2 x}{\cos^2 x} = \frac{1}{\cos^2 x} \cdot \frac{\tan^2 x}{1} \quad \checkmark$$

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$$5) \sin x + \csc x = \frac{\sin^2 x + 1}{\sin x}$$

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

$$\sin x + \csc x = \sin x + \csc x \quad \checkmark$$

$$4) \csc x + \cot x = \frac{\cos x + 1}{\sin x}$$

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

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

$$6) \csc^2 x + \tan^2 x = \cot^2 x + \sec^2 x$$

$$\left\{ \begin{array}{l} \cot^2 x + 1 + \sec^2 x - 1 \end{array} \right.$$

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

Name: _____

$$7) \frac{\sec^2 x}{\sin^2 x} = \frac{\csc^2 x}{\cos^2 x}$$

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

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

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

$$\frac{\csc^2 x}{\cos^2 x} = \frac{\csc^2 x}{\cos^2 x} \quad \text{||}$$

$$9) \frac{1}{\csc x \cdot (\csc x + 1)} = \frac{\sin^2 x}{\sin x + 1}$$

$$\frac{1}{\csc^2 x + \csc x}$$

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

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

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

$$\frac{\sin^2 x}{\sin x + 1} = \frac{\sin^2 x}{\sin x + 1} \quad \text{||}$$

$$8) -\sec x \sin x = -\tan x$$

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

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

$$-\tan x = -\tan x \quad \text{||}$$

$$10) \sec x \cot^2 x + 1 = \frac{\sin^2 x + \cos x}{\sin^2 x}$$

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

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

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

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

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