

Precalculus A

5.1 Fundamental Identities

Day One

Hw: 5.1 Assignment #2, Problem #1, 2, 4, 5, 6

The Basic Trigonometric Identities

Reciprocal Identities

$$\csc\theta = 1/\sin\theta$$

$$\sec\theta = 1/\cos\theta$$

$$\cot\theta = 1/\tan\theta$$

$$\sin\theta = 1/\csc\theta$$

$$\cos\theta = 1/\sec\theta$$

$$\tan\theta = 1/\cot\theta$$

Quotient Identities

$$\tan\theta = \sin\theta / \cos\theta$$

$$\cot\theta = \cos\theta / \sin\theta$$

Use basic identities to simplify the expression.

cot x sin x

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

sec x cos x

$$\frac{1}{\cancel{\cos x}} \cdot \frac{\cancel{\cos x}}{1} = \boxed{1}$$

csc x cot x sin x tan x

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

The Basic Trigonometric Identities

Pythagorean Identities

$$\sin^2 x + \cos^2 x = 1 \quad \sec^2 x = 1 + \tan^2 x \quad \csc^2 x = 1 + \cot^2 x$$

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

Use basic identities to simplify the expression.

$$5 \sec^2 x - 5 \tan^2 x$$
$$5(\sec^2 x - \tan^2 x)$$
$$5(1) = \boxed{5}$$

$$\frac{1 + \cot^2 x}{\sec^2 x}$$
$$\frac{\csc^2 x}{\sec^2 x}$$
$$\frac{\frac{1}{\sin^2 x}}{\frac{1}{\cos^2 x}} \rightarrow \frac{1}{\sin^2 x} \cdot \frac{\cos^2 x}{1}$$
$$= \frac{\cos^2 x}{\sin^2 x} = \boxed{\cot^2 x}$$

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

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

$$\csc^2 x = 1 + \cot^2 x$$