

Warm Up

Prove the following identities:

$$\frac{1}{\cot x} = \sin x \sec x$$

tanx

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

sinx $\left(\frac{1}{\cos x}\right)$

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

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

~~cos~~θ sin θ • $\frac{\sin \theta}{\cos \theta}$

$$\sin^2 \theta$$

Questions from last night's homework?

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

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

$$\frac{1 + \cot^2 \theta}{\csc^2 \theta} = 1$$

$$\frac{\tan^2 \theta}{1 + \tan^2 \theta} = \sin^2 \theta$$

$$\frac{\tan^2 \theta}{\sin^2 \theta} = 1 + \tan^2 \theta$$

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

$\sec^2 \theta$

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

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

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

Trig Identities

Quotient

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

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

Pythagorean

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

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

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

Reciprocal

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

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

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

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

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

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

Strategies for Proving Identities:

- Work on the most complex side and simplify so it has the same form as the simpler side
- Methods used in simplifying: direct substitution, factoring, finding a common denominator, multiplying by the conjugate

Prove the following identities:

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

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

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

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

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

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

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

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

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

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

Homework