Warm Up

Prove the following identities:

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

$\tan x$

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

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

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

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

$\sin^2\theta$

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

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

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

$\sin^2\theta$

Questions from last night's homework?

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

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

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

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

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

Questions from last night's homework?

② $\cot\theta\sec\theta = \csc\theta$

$\frac{\cos\theta}{\sin\theta}\left[\frac{1}{\cos\theta}\right] \quad \frac{1}{\sin\theta}$

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

③ $\frac{1+\cot^2\theta}{\csc^2\theta} = 1$

$\frac{\csc^2\theta}{\csc^2\theta}$

1

④ $\frac{\tan^2\theta}{1+\tan^2\theta} = \sin^2\theta$

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

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

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

$\sin^2\theta$

⑤ $\frac{\tan^2\theta}{\sin^2\theta} = 1+\tan^2\theta$

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

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

$\sec^2\theta$

$1+\tan^2\theta$

Questions from last night's homework?

g) $\cot\theta \cdot \csc\theta = \dfrac{\cos\theta}{1-\cos^2\theta}$

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

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

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

Trig Identities

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

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

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

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

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

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

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

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

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:

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

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

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

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

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

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

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

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

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

$$\left(\frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\cos\theta}\right)$$

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

Homework

1) $\sec^2\theta - \sin^2\theta = \cos^2\theta + \tan^2\theta$

$\tan^2\theta + 1 - \sin^2\theta$

$\tan^2\theta + \cos^2\theta$

$\cos^2\theta + \tan^2\theta$