

WARMUP - Copy this into Your Notes

Section 6.3 Establishing Identities

QUOTIENT: $\tan \theta = \frac{\sin \theta}{\cos \theta}$ $\cot \theta = \frac{\cos \theta}{\sin \theta}$

RECIPROCAL: $\csc \theta = \frac{1}{\sin \theta}$ $\sec \theta = \frac{1}{\cos \theta}$ $\cot \theta = \frac{1}{\tan \theta}$

PYTHAGOREAN: $\sin^2 \theta + \cos^2 \theta = 1 \Rightarrow \sin^2 \theta = 1 - \cos^2 \theta \Rightarrow \cos^2 \theta = 1 - \sin^2 \theta$
 $\tan^2 \theta + 1 = \sec^2 \theta \Rightarrow \tan^2 \theta = \sec^2 \theta - 1 \Rightarrow \sec^2 \theta - \tan^2 \theta = 1$
 $1 + \cot^2 \theta = \csc^2 \theta \Rightarrow \cot^2 \theta = \csc^2 \theta - 1 \Rightarrow \csc^2 \theta - \cot^2 \theta = 1$

An identity is an equation that is true for any number.

ex: $(x+1)^2 = x^2 + 2x + 1$

Establish the identity:

ex: $\sec \theta \cdot \sin \theta = \tan \theta$

To do these problems, rewrite the more complicated side and use our trig identities to transform the expression to what's on the other side.

$$\begin{aligned}\sec\theta \cdot \sin\theta &= \frac{1}{\cos\theta} \cdot \frac{\sin\theta}{1} \\ &= \frac{\sin\theta}{\cos\theta} \\ &= \tan\theta\end{aligned}$$

ex: $\sin\theta \cdot \csc\theta - \cos^2\theta = \sin^2\theta$

$$\begin{aligned}\sin\theta \cdot \csc\theta - \cos^2\theta &= \sin\theta \cdot \frac{1}{\sin\theta} - \cos^2\theta \\ &= 1 - \cos^2\theta \\ &= \sin^2\theta\end{aligned}$$

Assignment p480 1, 5, 6, 9, 13, 15

Establish each identity:

1) $\csc\theta \cdot \cos\theta = \cot\theta$

5) $\cos\theta (\tan\theta + \cot\theta) = \csc\theta$

6) $\sin\theta (\cot\theta + \tan\theta) = \sec\theta$

9) $(\sec\theta - 1)(\sec\theta + 1) = \tan^2\theta$

13) $\cos^2\theta (\tan^2\theta + 1) = 1$

15) $(\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2 = 2$