WARMUP

Copy these identities into your notes:

BASIC TRIG IDENTITIES

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

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

Pythagorean: $\sin^2\theta + \cos^2\theta = 1 \Rightarrow \sin^2\theta = 1 - \cos^2\theta \Rightarrow \cos^2\theta = 1 - \sin^2\theta$

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

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

Section 6.3 Trig Identities

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

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

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

$\sin^2\theta = (\sin\theta)^2$

Establish the identity:

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

To do these problems, rewrite the more complicated side and use our basic trig identities to transform the expression into the other side.

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

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

$$= \tan\theta$$

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

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

$$= 1 - \cos^2\theta$$

$$= \sin^2\theta$$

Assignment 1 Week 5

p480 1, 5, 6, 9, 13, 15, 16

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

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

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

$$= \cot\theta$$

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

$$\cos\theta(\tan\theta + \cot\theta) = \frac{\cos\theta}{1}\left(\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}\right)$$

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

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

$\frac{3}{3} \cdot \frac{5}{1} + \frac{1}{3}$

$\frac{15+1}{3}$

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

$= \csc\theta$

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

$\cos^2\theta(1+\tan^2\theta) = \cos^2\theta\left(1+\frac{\sin^2\theta}{\cos^2\theta}\right)$

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

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

$= 1$

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

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

$+ (\sin\theta-\cos\theta)(\sin\theta-\cos\theta)$

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

$+ \sin^2\theta - 2\sin\theta\cos\theta + \cos^2\theta$

$= 1 + 1$

$= 2$