

SOLUTIONS TO 2/24/10 POW

1. [2 pts]: $1 - \frac{\sin^2 \theta}{1 - \cos \theta} = -\cos \theta$

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

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

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

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

$$\frac{\cos \theta (\cos \theta - 1)}{1 - \cos \theta} = -\cos \theta$$

$$-\cos \theta = -\cos \theta$$

2. [2 pts]: $\frac{\cos x + 1}{\cos x - 1} = \frac{1 + \sec x}{1 - \sec x}$

$$\frac{\cos x + 1}{\cos x - 1} = \frac{1 + \sec x}{1 - \sec x}$$

$$\left(\frac{1}{\cos x} \right) \left(\frac{\cos x + 1}{\cos x - 1} \right) = \frac{1 + \sec x}{1 - \sec x}$$

$$\frac{1 + \sec x}{1 - \sec x} = \frac{1 + \sec x}{1 - \sec x}$$

3. [4 pts]: $\frac{\sin^2 \theta - \tan \theta}{\cos^2 \theta - \cot \theta} = \tan^2 \theta$

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

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

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

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

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

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

$$\tan^2 \theta = \tan^2 \theta$$

4. [4 pts]: $\frac{\sin^3 x + \cos^3 x}{1 - 2\cos^2 x} = \frac{\sec x - \sin x}{\tan x - 1}$

$$\frac{\sin^3 x + \cos^3 x}{1 - 2\cos^2 x} = \frac{\sec x - \sin x}{\tan x - 1}$$

$$\frac{(\sin x + \cos x)(\sin^2 x - \sin x \cos x + \cos^2 x)}{1 - \cos^2 x - \cos^2 x} = \frac{\sec x - \sin x}{\tan x - 1}$$

$$\frac{(\sin x + \cos x)(1 - \sin x \cos x)}{\sin^2 x - \cos^2 x} = \frac{\sec x - \sin x}{\tan x - 1}$$

$$\frac{(\sin x + \cos x)(1 - \sin x \cos x)}{(\sin x + \cos x)(\sin x - \cos x)} = \frac{\sec x - \sin x}{\tan x - 1}$$

$$\frac{1}{\sin x - \cos x} \times \frac{1}{\cos x} = \frac{\sec x - \sin x}{\tan x - 1}$$

$$\frac{\sec x - \sin x}{\tan x - 1} = \frac{\sec x - \sin x}{\tan x - 1}$$

POW DUE 3/3/10

A POW isn't going to get much easier than this week. Below are the derivatives of the six trigonometric functions.

- Your job is literally to copy each function and its derivative five times.
- Maintain the same format as outlined below (two columns, three rows.)
- Do this on the BACK OF THIS PAGE.
- Yes, that's it for your ten points. (All must be handwritten, and photocopying not permitted.)

$$f(x) = \sin x \rightarrow f'(x) = \cos x$$

$$f(x) = \tan x \rightarrow f'(x) = \sec^2 x$$

$$f(x) = \sec x \rightarrow f'(x) = \sec x \tan x$$

$$f(x) = \cos x \rightarrow f'(x) = -\sin x$$

$$f(x) = \cot x \rightarrow f'(x) = -\csc^2 x$$

$$f(x) = \csc x \rightarrow f'(x) = -\csc x \cot x$$