

Day 28 - Trig Identities

Reciprocal Identities

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

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

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

Feb 17-8:43 AM

Quotient Identities

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

Pythagorean Identities

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

Feb 17-10:47 AM

Example 1: Show that $\cos x \tan x = \sin x$

$$\cos x \tan x = \sin x$$

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

$$\boxed{\sin x = \sin x}$$

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

$$\boxed{\tan x = \tan x}$$

Feb 17-10:54 AM

Example 2: $\csc x \tan x = \sec x$

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

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

$$\boxed{\sec x = \sec x}$$

Feb 17-10:58 AM

Example 3: $\sin^2 \theta \sec \theta \csc \theta = \tan \theta$

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

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

$$\boxed{\tan \theta = \tan \theta}$$

Feb 17-11:01 AM

Example 4: $(1 + \sin x)(1 - \sin x) = \cos^2 x$

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

$$1 - \sin^2 x = \cos^2 x$$

$$\boxed{\cos^2 x = \cos^2 x}$$

Feb 17-11:04 AM

Example 5: $\sin \theta - \cos^2 \theta \sin \theta = \sin^3 \theta$

$$\sin \theta (1 - \cos^2 \theta) = \sin^3 \theta$$

$$\sin \theta (\sin^2 \theta) = \sin^3 \theta$$

$$\boxed{\sin^3 \theta = \sin^3 \theta}$$

Feb 17-11:08 AM

Example 6: $\sin x + \cot x \cos x = \csc x$

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

$$\text{sinx} \cdot \frac{\sin x}{1} + \frac{\cos^2 x}{\sin x} = \csc x$$

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

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

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

$$\csc x = \csc x$$

Feb 17-11:12 AM