

Group: _____ Present: _____

1. Verify the identity $(\cot^2(x) + 1)(1 - \cos^2(x)) = 1$.

First, check graphically: graph $Y_1 = ((1/\text{TAN}(X))^2 + 1)(1 - (\text{COS}(X))^2)$.

Is $Y_1 = 1$? _____ (Trace) Now simplify the left side:

$$(\cot^2(x) + 1)(1 - \cos^2(x)) =$$

2. Verify the identity $\frac{(\sec^2(\theta) - 1) \cot(\theta)}{\tan(\theta) \sin(\theta) + \cos(\theta)} = \sin(\theta)$.

Simplify the left side:

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

3. Verify the identity $\frac{1}{1 + \sin(t)} = (\sec(t) - \tan(t)) \sec(t)$ (for $t \neq \frac{\pi}{2} + k\pi$).

Simplify left side:

$$\frac{1}{1 + \sin(t)} =$$

Simplify right side:

$$(\sec(t) - \tan(t)) \sec(t) =$$

Once the two sides have been reduced to the same expression, the identity is verified.

Why the restriction on t ? Graph $Y_1 = 1/(1 + \text{SIN}(X))$ and $Y_2 = ((\text{COS}(X))^{-1} - \text{TAN}(X))/\text{COS}(X)$. What happens at $x = \frac{\pi}{2}$ and $x = \frac{3\pi}{2}$?