




# PRE-CALC & TRIG

Day 44



# Bell Work

Prove:

$$\frac{1 + \sin x}{\cos x} + \frac{\cos x}{1 + \sin x} = 2\sec x$$

# From Last Time

Day 1: Pg 377 #5, 6, 13, 14, 25–31 (odd), 79, 123

Day 2: Pg 377 #41–49 (odd), 125

## 5.2 Verifying IDs

**Objective: Verify (prove) trigonometric identities**

Review from Last Time:

Perform the addition and simplify:

$$\frac{\sin t}{1 + \cos t} + \frac{\cos t}{\sin t}$$

$$\frac{\sin t}{1 + \cos t} + \frac{\cos t}{\sin t}$$

Pythagorean Identity

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

Common Denominator

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

Divide by Common Factor

$$\frac{1}{\sin t}$$

Distribute and Combine

$$\frac{\sin^2 t + \cos^2 t + \cos t}{(1 + \cos t)(\sin t)}$$

Reciprocal Identity

**csc t**

# Guidelines to Verifying Trig Identities

1.) Work on ones side of equation at a time. Often it is best to work with the 'more complicated' side first. (You can not add an expression to both sides, or cross multiply because you don't know that they are equal yet).

2.) Look for opportunities to factor an expression, add fractions, square a binomial, or create a monomial denominator.

3.) Look for opportunities to use the fundamental identities.  
(Make note of which functions are in final expression you want). Sines and cosines pair up well, as do secants and tangents, cosecants and cotangents.

4.) If the first 3 Guidelines don't work, try converting all terms to sine and cosine.

5.) Always try something. Dead ends can provide insight.

Verify:  $\sec x \cot x = \csc x$



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$$\frac{1}{\cos x} \frac{\cos x}{\sin x} \stackrel{?}{=} \csc x \rightarrow \frac{1}{\sin x} = \mathbf{\csc x}$$

Verify:  $\cos x - \cos x \sin^2 x = \cos^3 x$

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

$$\cos x(\cos^2 x) = \cos^3 x$$

Verify:  $\frac{\sin x}{1+\cos x} = \frac{1-\cos x}{\sin x}$

Verify:  $\frac{1}{1+\cos x} + \frac{1}{1-\cos x} = 2 + 2 \cot x$

# For Next Time

Day 1: Pg 385 #3-8, 9-13 (odd), 17, 19, 23

Day 2: Pg 385 #10-20 (even), 25, 29, 31