

Warm Up 2/21**Lesson 7-1b: Trigonometric Identities II****Objectives**

Students will...

- Be able to prove or verify trigonometric identities.
- Be able to simplify expressions using trigonometric substitution.

Trigonometric Identities

Before we get any deep into trig analysis, we must first recall some of the basic trigonometric identities and definitions. Primarily,

$$\csc x = \quad \sec x = \quad \cot x = \quad \tan x = \quad \cot x =$$

Pythagorean Identity:

From this, we also get: \quad and \quad and

and

Methods for Proving Identities

One of the main components of trig analysis is to prove identities. There are _____ different methods for proving identities:

I. Rewrite _____ of the sides to match the other side.

Ex.

$$x + 3 = 6 \left(\frac{1}{6}x + \frac{11}{6} - \frac{13}{6} + \frac{5}{6} \right)$$

II. Modify _____ sides until they are the same.

Ex.

$$3(2x - 1) = 2x + 2 \left(2x - \frac{3}{2} \right)$$

Guidelines for Proving Identities

Furthermore, we have some guidelines/tips for proving identities.

1. _____: More often than not, identity proofs are more easily done when you work with the side that involves a fraction.
2. _____: It's easier to modify the sides that has less sines or cosines. Generally, rewriting everything as sine or cosine can help you when you are "stuck."
3. _____: Use algebra and the identities are already known to you. Look to combine multiple fractions into one with a common denominator.

Example

Prove/Verify the identity: $\cos \theta (\sec \theta - \cos \theta) = \sin^2 \theta$

Prove/Verify the identity: $\cos x \tan x = \sin x$

Prove/Verify the identity: $2 \tan x \sec x = \frac{1}{1-\sin x} - \frac{1}{1+\sin x}$

Prove/Verify the identity: $\tan \theta + \cot \theta = \sec \theta \csc \theta$

Prove/Verify the identity: $\frac{\cos u}{1-\sin u} = \sec u + \tan u$