Today's Learning Goal(s): By the end of the class, I will be able to:

a) prove trigonometric identities.

5.5 Trigonometric Identities

Date: _____

Equations are valid for only certain values of the variable.
For example:

$2x + 1 = 7$ $x^2 - 5x - 14 = 0$

Identities are valid for **all values** of the variable.
For example:

$2(x + 3) = 2x + 6$ $x^2 + 6x + 9 = (x + 3)^2$

Let's start with the circle definitions to develop some identities that we can use later.

SYR CXR TYX

$$\sin\theta = \frac{y}{r} \qquad \cos\theta = \frac{x}{r} \qquad \tan\theta = \frac{y}{x}$$

To Prove an Identity:

*** Separate the LS and RS, and work on them separately**

Ex.1 Prove that $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$

Restriction

$\cos\theta \neq 0$

$\theta \neq \cos^{-1}(0)$

$\theta \neq 90°$

Q.E.D. (also written QED)

"quod erat demonstrandum"

"that which was to be demonstrated"

Ex.2 Prove that $\sin^2\theta + \cos^2\theta = 1$

Ex.3 Prove that Use "known" identities; i.e. known since Ex.1&2

a) $\dfrac{\cos\alpha \tan\alpha}{\sin\alpha} = 1$

b) $\cos\phi = \dfrac{1}{\cos\phi} - \sin\phi \tan\phi$

Identities

Reciprocal Identities

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

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

Quotient Identities

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

Pythagorean Identities

$$\sin^2\theta + \cos^2\theta = 1$$

$$\tan^2\theta + 1 = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

Today's Homework Practice includes:
p. 310 #1 – 6

Work ahead? pp. 310-311 #8, 10 – 12 [14]
Worksheet a – j (***online***)

Note: Sometimes using substitution can help simplify a question.
Ex. Simplify $(1 - \cos\theta)(1 + \cos\theta)$ Change to $(1 - a)(1 + a)$