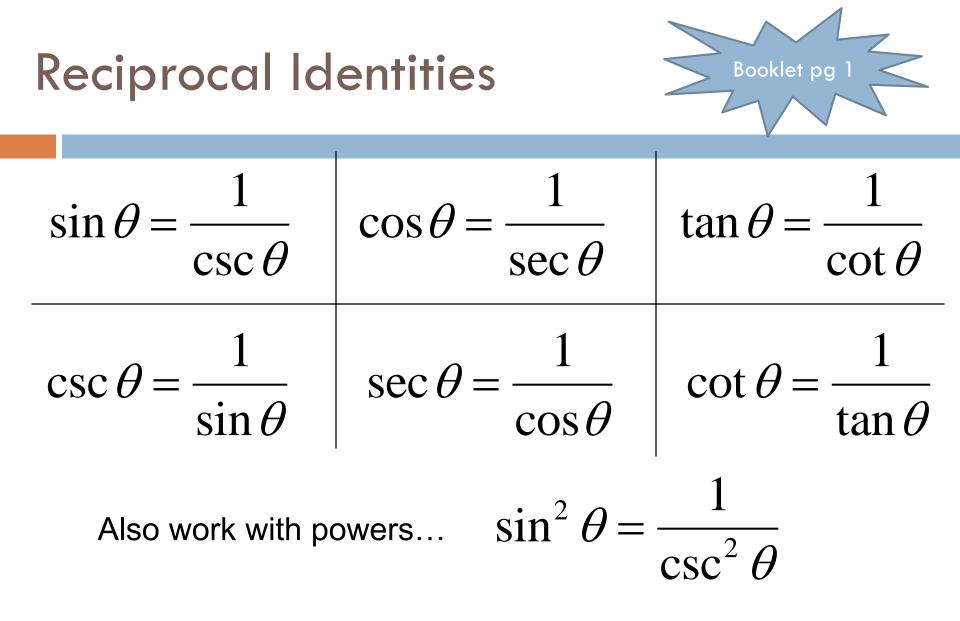
UNIT 3: TRIGONOMETRIC IDENTITIES

MA3A5. Students will establish the identities and use them to simplify trigonometric expressions and verify equivalence statements.

- LG 3-1 Simplifying & Verifying Identities
- LG 3-2 Applying Trig Identities

What is a trigonometric identity?

- A trigonometric identity is a trigonometric equation that is valid for all values of the variables for which the expression is defined.
- In this unit, you will be manipulating expressions to make them equal something
- □ When simplifying, you won't know the answer
- When verifying, you have the answer and your job is to manipulate one side of an equation to make it look like the other side





Quotient Identities

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{\sec \theta}{\csc \theta}$$

tan

 $\cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{\csc\theta}{\sec\theta}$

Pythagorean Identities



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

$sin(a \pm b) = sin(a)cos(b) \pm sin(b)cos(a)$

The identity above is a short hand method for writing two identities as one. When these identities are broken up, they look like:

sin(a + b) = sin(a)cos(b) + sin(b)cos(a)sin(a - b) = sin(a)cos(b) - sin(b)cos(a)

$cos(a \pm b) = cos(a)cos(b) \mp sin(a)sin(b)$

The identity above is a short hand method for writing two identities as one. When these identities are broken up, they look like:

cos(a+b) = cos(a)cos(b) - sin(a)sin(b)cos(a-b) = cos(a)cos(b) + sin(a)sin(b)



Double-Angle Identities

sin(2x) = 2sin x cos x

$$cos (2x) = cos^2 x - sin^2 x$$

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