**Precalculus Unit 6 Notes—Using Fundamental Trigonometric Identities**

**An identity is an equation that is true for every number in the domain of the equation.**

**The Reciprocal Identities**

  

  

**The Quotient Identities**

 

**The Pythagorean Identities**

  

**The Co-function Identities** Accomplished by reflecting across the y-axis and a phase shift right $\frac{π}{2}.$

  

  

**The Odd/Even Identities**  Recall symmetry proofs from Unit 1. Even functions are defined when $f(x)=f(-x)$ which shows symmetry about the y-axis. Odd functions are defined when $f(-x)=-f(x)$ which shows symmetry about the origin.

  

  

All the identities above (and others) are used to rewrite expressions in terms of predetermined trig functions.

**Examples of Rewriting Expressions:**

A) Rewrite  in terms of  B) Rewrite  in terms of 

**Simplifying Expressions using Trigonometric substitutions and algebra:**

You might want to try one or more of the following techniques:

1.) Change everything into sines and cosines.

2.) Use factoring to simplify the expression if possible.

3.) Get common denominators if there are fractions.

4.) Multiply both sides by a conjugate.

5.) Make substitutions using the identities.

\*\*\*When you simplify a trigonometric expression, the goal is to get a new expression which contains no fractions and contains the least number of terms possible.

Use fundamental identities, arithmetic, and/or algebraic properties to simplify the following expressions.

1) 

2) $cos^{2}θcscθsecθ$

3) $sinθcscθcotθ$

4) $cosθ(1+tan^{2}θ)$

5) 

6) 

7) 

8) 

9) $sin^{3}θ+sinθcos^{2}θ$

10) 

11) $(1+sinθ)(1-sinθ)$

12) $cot^{2}θ-csc^{2}θ$

13) $\frac{1}{cos^{2}x}-\frac{1}{cot^{2}x}$

14) $\frac{cosx}{1-sinx}-\frac{sinx}{cosx}$