Chapter 6 – Trigonometric Equations and Identities 6.1 Introduction to Proof & Reciprocal Identities

A <u>proof</u> {trigonometric one} requires you to manipulate one side {or both} of an algebraic equation so that they ultimately match. What you need to do for a proof is to show me that the left hand side of the equation is exactly the same of the right hand side of the equation.

This is done by:

- 1. Finding common denominators to add fractions
- 2. Adding\Subtracting like terms together in an expression
- 3. Distributing through a set of brackets
- 4. Factoring common terms
- 5. Changing Division of Two Fractions into Multiplication
- 6. Canceling Common Terms
- 7. Using the "conjugate" to write a fraction in a different form.
- 8. Substituting Existing Identities

YOU ARE NOT ALLOWED TO DO – EVER – TO MOVE "STUFF" FROM ONE SIDE OF AN EQUATION TO THE OTHER! YOU ARE NOT ALLOWED TO "SOLVE" – You can only manipulate how "stuff" looks.

An <u>Identity</u> is a statement that we have either:

- a. assumed it to be true (a definition)
- b. or have already proved it to be true

/ Chapter 4 and 5 has some identities that we have used:

Ę	$\sec \theta = \frac{1}{\cos \theta}$	$\csc\theta = \frac{1}{\sin\theta}$	$\cot \theta = \frac{1}{\tan \theta}$
	$\tan\theta = \frac{\sin\theta}{\cos\theta}$	$\cot\theta = \frac{\cos\theta}{\sin\theta}$	

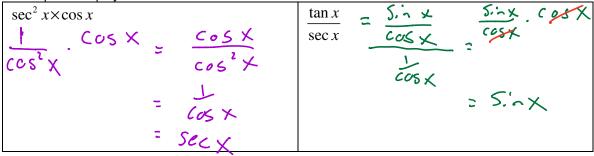
The "three" main types of problems for this section are:

a. <u>Simplify</u>: you attempt to change from the given expression to a much smaller one

b. Verify: you graph both sides of an expression to show that they are the same, or you substitute a known value for θ into both sides of the equation and show that they are the same. This is weak evidence because you must show that it works for all of the values of θ in the domain.

>c. Prove: Show that one side is exactly the same as the "other side"

Example: Simplify:



Example: Verify $\sin\theta \times \cos\theta \times \tan\theta = \cos\theta$ $\sin\theta(\tan\theta+\cot\theta)=\sec\theta$ $\frac{\sin\theta \times \cos\theta \times \tan\theta = \cos\theta}{\sin\theta - \cos\theta}$ $\frac{5inO}{\cos O} + 5inO}{\cos O} = 5ecO$ $\frac{5in^2O}{\cos O} + \cos O = 5ecO$ $\frac{5in^2O}{\cos O} + \cos O = 5ecO$ $\frac{5in^2O}{\sin^2O} + \cos^2O = 1$

