# Pre-Calculus Notes Name: _____

## Section 5.1 and 5.2 – Using Fundamental Identities

Example 1: Factor.

| | |
|---|---|
| a. $\sec^2\theta - 1$ | b. $4\tan^2\theta + \tan\theta - 3$ |
| c. $\sin x\cos^2 x - \sin x$ | d. $\csc^2\theta - \cot\theta - 3$ |

Example 2: Simplify.

| | |
|---|---|
| a. $\sin\alpha + \cot\alpha\cos\alpha$ | b. $\dfrac{1}{1+\sin x}$ |

### Guidelines for Verifying Identities:

1. Start with the most complicated side of the equation.
2. Factor an expression, add fractions, square a binomial, or create a monomial denominator, if possible.
3. Use the fundamental identities, whenever possible.
4. Convert all terms to sines and cosines.
5. Always try ***SOMETHING***.

Example 3: Verify the identity $\frac{\sec^2\theta - 1}{\sec^2\theta} = \sin^2\theta$.

Example 4: Verify the identity $\left(\tan^2\theta + 1\right)\left(\cos^2\theta - 1\right) = -\tan^2\theta$.

Example 5: Verify the identity $\tan x + \cot x = \sec x \csc x$.

Example 6: Verify the identity $\frac{1}{1-\sin\alpha}+\frac{1}{1+\sin\alpha}=2\sec^2\alpha$.

Example 7: Verify the identity $\sec\beta+\tan\beta=\frac{\cos\beta}{1-\sin B}$.

Example 8: Verify the identity $\tan\alpha-\tan\alpha\sin^2\alpha=\sin\alpha\cdot\cos\alpha$.