1 Section 6.1 Verification of Trigonometric Identities

The **domain** of an equation consists of all values of the variable for which every term is defiend.

Example 1 *Find the domain of* $\frac{\sin x \cos x}{\sin x} = \cos x$.

An **identity** is an equation that is true for all its domain values.
Guidelines of Verifying Trigonometric Identities

1. Begin with the more complex side.

2. Perform indicated operations

3. Make use of previously established identities

4. Rewrite one side in terms of only sines and/or cosines.

5. Rewrite one side in terms of a single trigonometric function.

6. Multiply both the numerator and the denominator of a function by the same factor.

7. Keep your goal in your mind.

Example 2 *Determine whether each equation is an identity:* 1)$1 + \tan^2 x = (1 + \tan x)^2$ 2)$2\cos^2 x + 1 = 3\cos^2 x + \sin^2 x$.

Example 3 *Verify the following Identities:*

1. $(1 + \tan x)^2 = 2\tan x + \sec^2 x$

2. $\tan^2 x = \sin^2 x \tan^2 x + \sin^2 x$

3. $\frac{\sec x + 1}{\tan x} = \frac{\tan x}{\sec x - 1}$

4. $\frac{\tan^2 x}{\cot^2 x + 1} = \frac{\sec^2 x - 1}{\csc^2 x}$

5. $\frac{1 - \tan x + \sec x}{1 + \tan x - \sec x} = \frac{1 + \sec x}{\tan x}$

6. $\frac{1 - \tan^4 x}{\sec^2 x} = 1 - \tan^2 x$

7. $\frac{2\sin x \cot x + \sin x - 4\cot x - 2}{2\cot x + 1} = \sin x - 2$

8. $\sqrt{\frac{1 + \sin x}{1 - \sin x}} = \frac{1 + \sin x}{\cos x}$, $\cos x > 0$.

Example 4 *Express* $\tan x$ *in terms of* $\cos x$.