Secondary 3 Honors Name:_____

11.2: Verifying Trigonometric Identities Practice

Verify each identity. Show all work.

1. $\frac{\csc^2 x - 1}{\csc^2 x} = \cos^2 x$

$\frac{\cot^2 x}{\csc^2 x} = \frac{\frac{\cos^2 x}{\sin^2 x}}{\frac{1}{\sin^2 x}} = \cos^2 x$ ∎

2. $2\csc x = \frac{1}{\csc x + \cot x} + \frac{1}{\csc x - \cot x}$

3. $\frac{\sin x}{1-\cos x} = \csc x + \cot x$

conjugate

$\frac{(\sin x)}{(1-\cos x)} \cdot \frac{(1+\cos x)}{(1+\cos x)} = \frac{\sin x(1+\cos x)}{1-\cos^2 x} = \frac{\sin x(1+\cos x)}{\sin^2 x}$

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

$= \frac{1+\cos x}{\sin x} = \frac{1}{\sin x} + \frac{\cos x}{\sin x}$

$\csc x + \cot x$ ∎

4. $\frac{\sin x}{\sec x - 1} = \cos x \cot x + \cot x$

conjugate

5. $\cos x \sec^2 x \tan x - \cos x \tan^3 x = \sin x$

$\cos x \tan x \left[\sec^2 x - \tan^2 x\right]$

$= 1$

$\cos x \tan x$

$\cos x \left[\frac{\sin x}{\cos x}\right] = \sin x$ ■

6. $\frac{\cos x}{1 - \sin x} - \frac{\cos x}{1 + \sin x} = 2 \tan x$

7. $\frac{\sin^4 x - \cos^4 x}{\sin^2 x - \cos^2 x} = 1$

$$\frac{(\sin^2 x - \cos^2 x)(\sin^2 x + \cos^2 x)}{\sin^2 x - \cos^2 x}$$

8. $\tan^2 x = \csc^2 x \tan^2 x - 1$

Verify that the equation is *not* an identity by finding an x value for which the left side of the equation is not equal to the right side.

9. $(\sin x + \cos x)^2 = \sin^2 x + \cos^2 x$

10. $\cos(x + 30°) = \cos x + \cos 30°$