

Name: _____

Verifying Trigonometric Identities

1) Factor each trigonometric expression

1) $\sec^2 x - 1$

2) $(\sin x + 1)^2 - (\sin x - 1)^2$

3) $\sin^2 x - 1$

4) $2\sin^2 x + 3\sin x + 1$

5) $\cos^4 x + 2\cos^2 x + 1$

6) $(\tan x + \cot x)^2 - (\tan x - \cot x)^2$

7) $4\tan^2 x + \tan x - 3$

2) Each expression simplifies to a constant, a single function, or a power of a function. Use fundamental identities to simplify each expression

1) $\cot \theta \sin \theta$

2) $\sec \theta \cos \theta$

3) $\cot \theta \tan \theta$

4) $\tan \theta \cos \theta$

5) $\frac{\sin \beta \tan \beta}{\cos \beta}$

6) $\frac{\csc \beta \sec \beta}{\cot \beta}$

7) $\csc^2 \beta - 1$

8) $\sec^2 \beta - 1$

9) $\frac{\sin^2 x}{\cos^2 x} + \sin x \csc x$

10) $\frac{1}{\tan^2 x} + \cot x \tan x$

3) Prove each identity

1) $\frac{1 + \sec \theta}{\csc \theta} = \sin \theta + \tan \theta$

2) $\tan^2 x (1 + \cot^2 x) = \frac{1}{1 - \sin^2 x}$

3) $\frac{\tan t - \cot t}{\sin t \cos t} = \sec^2 t - \csc^2 t$

4) $\frac{\cos x}{1 - \sin x} = \frac{1 + \sin x}{\cos x}$

5) $\frac{\sec x + \tan x}{\sec x - \tan x} = \frac{1 + 2\sin x + \sin^2 x}{\cos^2 x}$