# Trig Identities Name: _____

1. $\csc\theta - \sin\theta = \cot\theta\cos\theta$

2. $\dfrac{\sec^2\theta - \tan^2\theta}{\sec^2\theta} = \cos^2\theta$

3. $\dfrac{\cot\theta + 1}{\cot\theta} = 1 + \tan\theta$

4. $\sin\theta + \sin\theta\cot^2\theta = \csc\theta$

5. $\dfrac{\sin\theta}{\csc\theta} + \dfrac{\cos\theta}{\sec\theta} = 1$

6. $\csc\theta\csc\theta - 1 = \cot^2\theta$

7. $\cos\theta\csc\theta = \cot\theta$

8. $\dfrac{\tan\theta}{\sec\theta} = \sin\theta$

9. $\tan\theta\sin\theta + \cos\theta = \sec\theta$

10. $\sin^2\theta\left(1 + \cot^2\theta\right) = 1$

11. $\sec^2\theta\cot^2\theta - \cos^2\theta\csc^2\theta = 1$

12. $\dfrac{\sin^2\theta}{\cos\theta} + \cos\theta = \sec\theta$

13. $\dfrac{\sec\theta\csc\theta}{\tan\theta + \cot\theta} = 1$

14. $2 - \sin^2\theta = 1 + \cos^2\theta$

## Trigonometric Identities

**32.** Prove each identity.

a) $\dfrac{1-\sin^2 x}{\cos x} = \cos x$

b) $\dfrac{\tan x}{\sin x} = \dfrac{1}{\cos x}$

c) $\dfrac{\sin x \cos x}{\tan x} = 1 - \sin^2 x$

d) $\cos^2 x + \dfrac{\sin x \cos x}{\tan x} = 2\cos^2 x$

e) $1 + \tan^2 x = \dfrac{1}{\cos^2 x}$

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

g) $\dfrac{1}{\sin x} - \sin x = \dfrac{\cos x}{\tan x}$

h) $\dfrac{1-\tan^2 x}{1+\tan^2 x} = \cos^2 x - \sin^2 x$

**33.** Use a graphing calculator to show that each equation appears to be an identity. Then, prove the equation is an identity.

a) $\dfrac{1}{1+\cos x} + \dfrac{1}{1-\cos x} = \dfrac{2}{\sin^2 x}$

b) $\dfrac{1+\cos x}{\sin x} - \dfrac{\sin x}{1-\cos x} = 0$

**34.** Prove each identity.

a) $(\sin x - \cos x)(\sin x + \cos x) = 2\sin^2 x - 1$

b) $(\sin x - \cos x)^2 = 1 - 2\sin x \cos x$

c) $1 + \tan^2 x = \dfrac{1}{\cos^2 x}$

d) $\cos^2 x - \cos^4 x = \cos^2 x \sin^2 x$

e) $(1 - \cos^2 x)(1 + \tan^2 x) = \tan^2 x$

f) $\dfrac{\sin x}{1-\cos x} - \dfrac{1+\cos x}{\sin x} = 0$