



2023-2024

8.2 Proving Trigonometric Identities

SCORE: /

Name _____ Date _____ Period _____

Multiply and simplify.

1. $(\sin x + 1)(\sin x - 1)$

2. $(2\cos x + 1)(\cos x - 1)$

3. $(\csc x + \sin x)^2$

4. $(2\sin x - 1)(2\sin x + 1)$

Factor each expression.

5. $2\sin^2 \alpha - 5\sin \alpha - 3$

6. $4\sec^2 x + 4\sec x + 1$

7. $\sin^2 x - 4\sin x$

8. $\tan^2 \theta - \sec^2 \theta$

9. $\tan^2 x - 6 \tan x + 8$

10. $10 \tan^2 x + 5 \tan x$

11. $1 - \cos^2 x$

12. $\cos x + \frac{\cos x}{\tan x}$

Prove each of the following equations is an identity. Show all work! Each step!

13. $\sin(\theta) \cot(\theta) = \cos(\theta)$

14. $1 - \sec(x) \cos^3(x) = \sin^2 x$

15. $\frac{\cos \alpha \sin^2 \alpha + \cos^3 \alpha}{\sin \alpha} = \cot \alpha$

16. $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$

$$17. \tan \alpha \cos \alpha + \csc \alpha \sin^2 \alpha = 2 \sin \alpha$$

$$18. (1 - \sin^2 \theta)(1 + \sin^2 \theta) = 2 \cos^2 \theta - \cos^4 \theta$$

$$19. \tan(x) + \cot(x) = \sec(x) \csc(x)$$

$$20. \frac{\sin(x)}{\sin(x)+1} = \frac{\csc(x)-1}{\cot^2(x)}$$

$$21. \frac{\csc x + 1}{\csc x - 1} = \frac{1 + \sin x}{1 - \sin x}$$

$$22. \csc^2 \beta = \cos^2 \beta + \cot^2 \beta + \sin^2 \beta$$

23. Evaluate without using a calculator or unit circle. Some of these expressions are undefined. **Show work.**

a) $\sin\left(\frac{9\pi}{4}\right)$

b) $\sec\left(\frac{13\pi}{6}\right)$

c) $\tan\left(\frac{-3\pi}{2}\right)$

24. Find the amplitude, phase shift, frequency, period, and range of the given function.

$$f(x) = -3\sin\left[5\left(x - \frac{\pi}{2}\right)\right] + 7$$