

2. Examine the graph of $f(x) = \sec x$ on the interval $[-\pi, \pi]$. How can we tell whether the function is even or odd by only observing the graph of $f(x) = \sec x$?

4. All of the Pythagorean identities are related. Describe how to manipulate the equations to get from $\sin^2 t + \cos^2 t = 1$ to the other forms.

For the following exercises, verify the identity.

29. $\cos x - \cos^3 x = \cos x \sin^2 x$

30. $\cos x(\tan x - \sec(-x)) = \sin x - 1$

31. $\frac{1 + \sin^2 x}{\cos^2 x} = \frac{1}{\cos^2 x} + \frac{\sin^2 x}{\cos^2 x} = 1 + 2 \tan^2 x$

32. $(\sin x + \cos x)^2 = 1 + 2 \sin x \cos x$

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

For the following exercises, use the fundamental identities to fully simplify the expression.

6. $\sin(-x)\cos(-x)\csc(-x)$

8. $\csc x + \cos x \cot(-x)$

9. $\frac{\cot t + \tan t}{\sec(-t)}$

10. $3 \sin^3 t \csc t + \cos^2 t + 2 \cos(-t)\cos t$

11. $-\tan(-x)\cot(-x)$

12. $\frac{-\sin(-x)\cos x \sec x \csc x \tan x}{\cot x}$

For the following exercises, determine whether the identity is true or false. If false, find an appropriate equivalent expression.

40. $\frac{\cos^2 \theta - \sin^2 \theta}{1 - \tan^2 \theta} = \sin^2 \theta$

41. $3 \sin^2 \theta + 4 \cos^2 \theta = 3 + \cos^2 \theta$

42. $\frac{\sec \theta + \tan \theta}{\cot \theta + \cos \theta} = \sec^2 \theta$