

Section 6.1 Extra Practice

1. Determine the non-permissible values of x , in radians, for each expression.

a) $\frac{\sin x}{\cos x}$

b) $\frac{\sec x}{\sin x}$

c) $\frac{\tan x}{1 - \cos x}$

d) $\frac{\cot x}{\sin x + 1}$

2. Determine the non-permissible values, in radians, for the following equation.

$$\frac{1 + \cos \theta}{\sin \theta} = \frac{\sin \theta}{1 - \cos \theta}$$

3. Simplify each expression to one of the three primary trigonometric functions, $\sin x$, $\cos x$, or $\tan x$.

a) $\frac{\cot x}{\csc x}$

b) $\cot x \sin x$

c) $\frac{1}{\cot x \sec x}$

d) $\frac{1 - \tan x}{\cot x - 1}$

4. Verify graphically, using technology, that the expression in #3b) is equivalent to its simplified form.

5. Simplify each expression.

a) $2(\csc^2 x - \cot^2 x)$

b) $\cot^2 x (\sec^2 x - 1)$

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

d) $\frac{\cos x}{\sin x \cot x}$

e) $\tan x \cos^2 x$

f) $\frac{1}{\sec^2 x} + \frac{1}{\csc^2 x}$

6. Use a graphing calculator to determine whether each equation might be an identity.

a) $\sin^2 x \sec^2 x = \sec^2 x - 1$

b) $\frac{1}{\sec x} + \frac{1}{\csc x} = 1$

c) $\cot x + \tan x = \csc x \cot x$

7. Simplify each expression, then rewrite the expression as one of the three reciprocal trigonometric functions, $\csc x$, $\sec x$, or $\cot x$.

a) $\frac{\sec x}{\sin x} - \frac{\sin x}{\cos x}$

b) $\cos x + \tan x \sin x$

c) $\sin x + \cos x \cot x$

8. Verify the following equation is true

for $x = \frac{\pi}{6}$.

$$\sin^4 x - \cos^4 x = 2 \sin^2 x - 1$$

9. Consider the following equation.

$$\sec x + \sec x \cos x = 1 + \sec x.$$

Show that the equation is true

for $x = \frac{\pi}{4}$.

10. Consider the equation

$$\frac{\cos x}{\sec x - 1} + \frac{\cos x}{\sec x + 1} = 2 \cot^2 x.$$

a) Verify the equation is true for $x = \frac{\pi}{6}$.

b) What are the non-permissible values of the equation in the domain $0^\circ \leq x < 360^\circ$.

11. Algebraically transform the Pythagorean identity $\cos^2 x + \sin^2 x = 1$ into the equivalent identity $\cot^2 x + 1 = \csc^2 x$

