Name: ____ Date:____________________________

Section 6.1 Extra Practice

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

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

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

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

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

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) $\dfrac{\cot x}{\csc x}$

b) $\cot x \sin x$

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

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

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

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

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

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

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 $0° \le x < 360°$.

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

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Section 6.2 Extra Practice

1. Write each expression as a single trigonometric function.

a) $\sin 28° \cos 35° + \cos 28° \sin 35°$
b) $\cos 10° \cos 7° - \sin 10° \sin 7°$
c) $\cos \frac{\pi}{12} \cos \frac{\pi}{4} + \sin \frac{\pi}{12} \sin \frac{\pi}{4}$
d) $\sin \frac{\pi}{3} \cos \frac{\pi}{4} - \cos \frac{\pi}{3} \sin \frac{\pi}{4}$

2. Simplify and then give an exact value for each expression.

a) $\cos 25° \cos 5° - \sin 25° \sin 5°$
b) $\sin 40° \cos 20° + \cos 40° \sin 20°$
c) $\sin \frac{\pi}{3} \cos \frac{\pi}{6} + \cos \frac{\pi}{3} \sin \frac{\pi}{6}$
d) $\cos \frac{7\pi}{12} \cos \frac{\pi}{3} + \sin \frac{7\pi}{12} \sin \frac{\pi}{3}$

3. Write each expression as a single trigonometric function.

a) $2\sin \frac{\pi}{6} \cos \frac{\pi}{6}$
b) $\cos^2 \frac{\pi}{3} - \sin^2 \frac{\pi}{3}$
c) $1 - 2\sin^2 15°$
d) $\dfrac{2\tan \frac{\pi}{6}}{1 - \tan^2 \frac{\pi}{6}}$

4. Simplify each expression using a sum identity.

a) $\sin (90° + A)$ **b)** $\cos (90° + A)$
c) $\sin (\pi + A)$ **d)** $\cos (2\pi + A)$

5. Simplify each expression using a difference identity.

a) $\sin (90° - A)$ **b)** $\sin (270° - A)$
c) $\sin \left(\frac{\pi}{2} - A\right)$ **d)** $\cos \left(\frac{3\pi}{2} - A\right)$

6. Simplify each expression to a single primary trigonometric function.

a) $\dfrac{\sin 2\theta}{2\sin \theta}$
b) $\cos 3x \cos x - \sin 3x \sin x$
c) $\dfrac{\cos 2\theta - 1}{2\sin \theta}$
d) $\dfrac{\sin^3 x}{\cos 2x - \cos^2 x}$

7. Determine the exact value of each trigonometric expression.

a) $\cos \frac{2\pi}{3}$
b) $\tan 15°$
c) $\sin 105°$
d) $\cos \frac{5\pi}{6}$

8. Determine whether each equation is true.

a) $\cos 80° = \cos 75° \cos 5° - \sin 75° \sin 5°$
b) $\cos (-24°) = \cos 16° - \cos 40°$
c) $\tan 70° = \dfrac{2\tan 30°}{1 - \tan^2 70°}$

9. If $\angle A$ and $\angle B$ are both in quadrant I, and $\sin A = \frac{3}{5}$ and $\cos B = \frac{5}{13}$, evaluate each of the following.

a) $\cos (A - B)$
b) $\sin (A + B)$
c) $\cos 2A$
d) $\sin 2A$

10. If $\cos A = \frac{12}{13}$, and $\angle A$ is in quadrant IV, find the exact value of $\sin 2A$.