

Trigonometric Identities Review

Name: _____

1. Simplify each of the following expressions to a single trigonometric function:

a) $\cos m \sin 5m + \cos 5m \sin m$

b) $\sin(\pi + 2x)$

c) $4 \cos^2 6x - 2$

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

2. Determine the non-permissible value(s) for the expression $\frac{\tan x}{2 \cos x - 1}$ if $0 \leq x < 2\pi$.

3. Given $\frac{\tan \theta}{\cos \theta - 1}$, express all non-permissible values in general form.

4. If $\sec A = -\frac{4}{3}$, $\frac{\pi}{2} \leq A \leq \pi$, find each of the following in exact value:

a) $\sin\left(\frac{\pi}{3} - A\right)$

b) $\sin 2A$

5. Prove each of the following identities.

a) $\tan x \cdot (\sin x + \cot x \cdot \cos x) = \sec x$

b) $\frac{1}{1 + \cos \theta} = \csc^2 \theta - \csc \theta \cot \theta$

c) $\tan x = \csc 2x - \cot 2x$

d) $\frac{\tan x}{\sec x + 1} = \frac{2 \cos x - 2 \cos^2 x}{\sin 2x}$

6. Solve algebraically: $\cos 2\theta + \cos \theta = -1$, for $0 \leq \theta < 2\pi$.

7. Solve: $2 \cot x + 3 = 0$, where $0 \leq x < 2\pi$. (Accurate to 2 decimal places.)

8. Solve $\csc x = 2$, for all real numbers.

Answers:

1. a) $\cos 6x$ b) $-\sin 2x$ c) $2 \cos 12x$ d) $-\cos 2x$ 2. $x \neq \frac{\pi}{3}, \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{3}$ 3. $x \neq \frac{\pi}{2} + \pi n, x \neq 2\pi n, n \in \mathbb{Z}$
4. a) $\frac{-3\sqrt{3} - \sqrt{7}}{8}$ b) $\frac{-3\sqrt{7}}{8}$ 5. Answers may vary 6. $x = \frac{\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{3\pi}{2}$
7. $x = 2.55, 5.70$ 8. $x = \frac{\pi}{6} + 2\pi n, \frac{5\pi}{6} + 2\pi n, n \in \mathbb{Z}$