

Name: _____ Date: _____

Unit 11: Trig. Identities Review

Multiple Choice

For #1 to #5, choose the best answer.

- Simplify the expression $\frac{\cot^2\theta}{1 + \cot^2\theta}$.
A $\cos^2\theta$ B $\sin^2\theta$ C $\tan^2\theta$ D $\sec^2\theta$
- The value of $(\sin x - \cos x)^2 + \sin 2x$ is
A -1 B 0 C 1 D 2
- The expression $\frac{1 - \tan^2\theta}{1 + \tan^2\theta}$ is equivalent to
A $\cos 2\theta$ B $\sin 2\theta$ C $\cos^2\theta$ D $\sin^2\theta$
- If you simplify $\sin(\pi + x) + \sin(\pi - x)$ it is
A -2 B 0 C 2 D not possible
- Which of the following is *not* an identity?
A $\sec\theta - \cos\theta = \sin\theta \tan\theta$ B $1 - \cos^2\theta = \cos^2\theta \tan^2\theta$
C $\csc\theta - \cos\theta \tan\theta = \frac{\cos\theta}{\tan\theta}$ D $\cos^2\theta = \frac{1 - \cos 2\theta}{2}$

Short Answer

- Determine the exact value of $\sin\left(-\frac{5\pi}{12}\right)$.
- Given $\frac{\sin^2 x}{1 - \cos x} = 1.23$. What is the value of $\cos x$?
- If $5 - 7 \sin \theta - 2 \cos^2 \theta = 0$ on the domain $90^\circ \leq \theta \leq 180^\circ$, what is the value of θ ?
- If $\cos\theta = \frac{-5}{13}$, $\pi \leq \theta \leq \frac{3\pi}{2}$, determine the exact value of $\sin\left(\theta - \frac{\pi}{2}\right)$.
- What single trigonometric function is equivalent to $\sin(3y) \cos\left(\frac{y}{2}\right) - \cos(3y) \sin\left(\frac{y}{2}\right)$?

Extended Response

- Consider the equation $\sin\left(x + \frac{\pi}{2}\right) = \csc x - 1$
 - Verify the equation is true for $x = \frac{\pi}{2}$.
 - Is the equation an identity? Explain.

12. Consider the equation

$$\sin^2 x + \cos^4 x = \cos^2 x + \sin^4 x.$$

- a) Verify the equation for $x = 30^\circ$.
- b) Prove the equation is an identity.

13. Consider the equation $\frac{\tan x + \sec x}{\cot x} = \frac{\sin x}{1 - \sin x}$.

- a) State the non-permissible values on the domain $0^\circ \leq x \leq 360^\circ$.
- b) Prove the equation is an identity algebraically.

14. Solve $\sin 2x - \cos x = 0$ algebraically for the domain $-\pi \leq x \leq \pi$.

15. Solve $\csc^2 x = 4 \cot^2 x$ algebraically. State the general solution in radians.

Answers:

1. A 2. C 3. A 4. B 5. D

6. $\frac{-\sqrt{6} - \sqrt{2}}{4}$

7. 0.23

8. 150°

9. $\frac{5}{13}$

10. $\sin\left(\frac{5y}{2}\right)$

11. b) No; it is not true for all permissible values of x .

13. a) $x \neq 0^\circ, 90^\circ, 180^\circ, 270^\circ, 360^\circ$

14. $\pm \frac{\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

15. $\frac{\pi}{3} + \pi n, \frac{2\pi}{3} + \pi n; n \in \mathbb{I}$