

Identify the choice that best completes the statement or answers the question.

- 1) Factor; then use the fundamental identities to simplify the expression below and determine which of the following is *not* equivalent. $\cot^2 \alpha - \cot^2 \alpha \cos^2 \alpha$

A) $\frac{1}{\sec^2 \alpha}$ B) $\sin^2\left(\frac{\pi}{2} - \alpha\right)$ C) $\tan^2 \alpha$ D) $\cos^2 \alpha$ E) $1 - \sin^2 \alpha$

- 2) If $x = 9 \tan \theta$, use trigonometric substitution to write $\sqrt{81 + x^2}$ as a trigonometric function of θ where $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$

A) $9|\cos \theta|$ B) $9 \cos \theta$ C) $9|\sec \theta|$ D) $9 \sec \theta$ E) NOTA

- 3) Simplify: $\sec^4 x - 2 \sec^2 x \tan^2 x + \tan^4 x$

A) $\sec^2 x + \tan^2 x$ B) $\sec^2 x(1 + \tan^2 x)$ C) 1 D) 2 E) NOTA

- 4) Given $\sin \alpha = \frac{3}{4}$, $\frac{\pi}{2} < \alpha < \pi$; $\cos \beta = -\frac{1}{3}$, $\frac{\pi}{2} < \beta < \pi$, find $\sin(\alpha - \beta)$.

A) $\frac{2\sqrt{14} - 3}{12}$ B) $\frac{2\sqrt{14} + 3}{12}$ C) $\frac{10\sqrt{2} - 3}{12}$ D) $-\frac{10\sqrt{2} + 3}{12}$ E) NOTA

- 5) Find the exact value of the expression: $\sec\left(\text{Arc sin}\left(-\frac{3}{4}\right)\right)$.

A) $\frac{5}{4}$ B) $-\frac{5}{4}$ C) $-\frac{\sqrt{7}}{4}$ D) $\frac{\sqrt{7}}{3}$ E) NOTA

- 6) Given the trigonometric equation $3 \tan^2 \frac{x}{4} = 2$. How many solutions are there in the interval $[0, \pi)$? Use your graphing utility.

A) 2 solutions B) 4 solutions C) 1 solution D) 0 solutions E) not enough information

- 7) Find the exact value of $\cos\left[2 \tan^{-1}\left(-\frac{4}{3}\right)\right]$

A) $\frac{3}{5}$ B) $-\frac{3}{5}$ C) $\frac{7}{25}$ D) $-\frac{7}{25}$ E) NOTA

Solve the following Trigonometric Equations in the interval $[0, 2\pi)$. Must show all work. Give exact value.

8) $3 \sin x + 2 = \cos 2x$

9) $2 \tan x \cos x + 2 \cos x - \tan x - 1 = 0$

10) $\sin 3x = 1$

11) $2 \sec^2 x + 3 \sec x - 2 = 0$

12) $10 \cos x - 5\sqrt{3} = 0$

13) $\sin^2 x - 2 \sin x - 3 = 0$

14) $\cos 2x = \cos x$

15) $\sin x \cos x = 1$

Solve the equation graphically. Find all solutions in the interval $[0, 2\pi)$. Round 3 decimal places.

16) $\cos^3 x - 2 \sin x - 0.7 = 0$

17) $\sin 2x = x^3 - 5x^2 + 5x + 1$

Find the exact value of the expression:

18) $\cos \left[\sin^{-1} \frac{1}{3} - \tan^{-1} \frac{1}{2} \right]$

Simplify:

19) $\csc x \tan x$ 20) $\frac{\cot x + \tan x}{\cot x}$

Answers:

1) C 2) D 3) C 4) A 5) E 6) C 7) D 8) $x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}$ 9) $x = \frac{\pi}{3}, \frac{5\pi}{3}, \frac{3\pi}{4}, \frac{7\pi}{4}$

10) $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$ 11) $x = \frac{2\pi}{3}, \frac{4\pi}{3}$ 12) $x = \frac{\pi}{6}, \frac{11\pi}{6}$ 13) $x = \frac{3\pi}{2}$ 14) $x = 0, \frac{2\pi}{3}, \frac{4\pi}{3}$

15) No Solution 16) $x \approx .137, 3.789$ 17) $x \approx 1.849, 3.591$ 18) $\frac{4\sqrt{10} + \sqrt{5}}{15}$

19) $\sec x$ 20) $\sec^2 x$