

Assignment description: MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solution:

In the problems 1 – 3, $\sin \theta$ and $\cos \theta$ are given. Find the exact value of the indicated trigonometric function.

1) $\sin \theta = \frac{6}{10}$ and $\cos \theta = \frac{8}{10}$

Find $\tan \theta$.

A) $\sqrt{15}$

B) 4

C) $\frac{3}{4}$

D) $\frac{\sqrt{15}}{15}$

E) none of the above

Solution:

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{6}{10} / \frac{8}{10} = \frac{3}{4}$$

ANSWER: C

2) $\sin \theta = \frac{3}{\sqrt{34}}$ and $\cos \theta = \frac{5}{\sqrt{34}}$

Find $\csc \theta$.

A) $\frac{4}{3}$

B) $\frac{3\sqrt{7}}{7}$

C) $\frac{\sqrt{34}}{3}$

D) $\frac{4\sqrt{7}}{7}$

E) none of the above

Solution:

$$\csc \theta = \frac{1}{\sin \theta} = \frac{\sqrt{34}}{3}$$

ANSWER: C

3) $\sin \theta = \frac{2}{5}$ and $\cos \theta = \frac{\sqrt{21}}{5}$ **Find $\cot \theta$.**

A) $\frac{\sqrt{21}}{2}$

B) $\frac{3}{2}$

C) $\frac{2\sqrt{5}}{5}$

D) $\frac{3\sqrt{5}}{5}$

E) none of the above

Solution:

$$\cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{\sqrt{21}}{5} / \frac{2}{5} = \frac{\sqrt{21}}{2}$$

ANSWER: A

4) Find the phase shift of the function $y = -4 \sin \left(4x - \frac{\pi}{2} \right)$

A) $\frac{\pi}{8}$ units to the rightB) 4π units downC) 4π units upD) $\frac{\pi}{2}$ units to the left

E) none of the above

Solution:

$$-4 \sin\left(4x - \frac{\pi}{2}\right) = -4 \sin\left(4\left(x - \frac{\pi}{8}\right)\right)$$

So function is shifted right to $\frac{\pi}{8}$

ANSWER: A

5) Simplify the expression $\frac{\cos \theta}{1 + \sin \theta} + \tan \theta$

- A) $\sin^2 \theta$
- B) $\cos \theta + \sin \theta$
- C) $\sec \theta$
- D) 1
- E) none of the above

Solution:

$$\frac{\cos \theta}{1 + \sin \theta} + \tan \theta = \frac{\cos \theta}{1 + \sin \theta} + \frac{\sin \theta}{\cos \theta} = \frac{\cos^2 \theta + \sin \theta + \sin^2 \theta}{\cos \theta (1 + \sin \theta)} = \frac{1}{\cos \theta} = \sec \theta$$

ANSWER: C

6) Find the exact value of the expression $\sin 25^\circ \cos 35^\circ + \cos 25^\circ \sin 35^\circ$

- A) $\frac{1}{2}$
- B) $\frac{\sqrt{3}}{2}$
- C) $\frac{\sqrt{3}}{3}$
- D) $\frac{5}{12}$
- E) none of the above

Solution:

$$\sin 25^\circ \cos 35^\circ + \cos 25^\circ \sin 35^\circ = \sin(25^\circ + 35^\circ) = \sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

ANSWER: B

7) Find the exact value under the given conditions

$$\sin \alpha = \frac{21}{29}, 0 < \alpha < \frac{\pi}{2}$$

$$\cos \beta = \frac{3}{5}, 0 < \beta < \frac{\pi}{2}$$

Find $\cos(\alpha + \beta)$.

A) $-\frac{17}{145}$

B) $\frac{144}{145}$

C) $\frac{143}{145}$

D) $-\frac{24}{145}$

E) none of the above

Solution:

$$\begin{aligned}\cos(a + b) &= \cos a \cos b - \sin a \sin b = \sqrt{1 - \sin^2 a} \cos b - \sin a \sqrt{1 - \cos^2 b} = \frac{3}{5} \cdot \frac{20}{29} - \frac{21}{29} \cdot \frac{4}{5} \\ &= -\frac{24}{145}\end{aligned}$$

ANSWER: D

8) Complete the identity $\cos\left(\frac{\pi}{2} + \theta\right)$

A) $\sin \theta$

B) $-\sin \theta$

C) $-\cos \theta$

D) $\cos \theta$

E) none of the above

Solution:

$$\cos\left(\theta + \frac{\pi}{2}\right) = -\sin \theta$$

ANSWER: B

9) Find the exact value of the expression

$$\sin\left(\cos^{-1}\frac{1}{2} - \sin^{-1}\frac{\sqrt{3}}{2}\right)$$

A) 0

B) 1

C) $\frac{\sqrt{3}}{3}$

D) $\frac{2\sqrt{3}}{2}$

E) none of the above

Solution:

$$\cos^{-1}\frac{1}{2} = \frac{\pi}{3}$$

$$\sin^{-1}\frac{\sqrt{3}}{2} = \frac{\pi}{3}$$

$$\sin 0 = 0$$

ANSWER: A

10) Solve the equation $2 \sin \theta + \sqrt{3} = 0$ on the interval $0 \leq \theta < 2\pi$

A) $\frac{3\pi}{2}$

B) $\frac{\pi}{3}, \frac{2\pi}{3}$

C) $\frac{2\pi}{3}, \frac{4\pi}{3}$

D) $\frac{4\pi}{3}, \frac{5\pi}{3}$

E) none of the above

$$\sin \theta = -\frac{\sqrt{3}}{2}$$

$$\theta = \frac{4}{3}\pi, \quad \theta = \frac{5\pi}{3}$$

ANSWER: D