

Part A: Selected Response: Place the letter of the correct response in the space provided (9 marks)

1. What are the non-permissible values for x for the equation $\sec x \sin x = \tan x$?

A) $x \neq 0 + \frac{\pi}{2}k, k \in I$

B) $x \neq 0 + \pi k, k \in I$

C) $x \neq \frac{\pi}{2} + \frac{\pi}{2}k, k \in I$

D) $x \neq \frac{\pi}{2} + \pi k, k \in I$

2. What is the simplified form for $\cos\left(\frac{\pi}{2} - x\right) - \cos\left(\frac{\pi}{2} + x\right)$?

A) $-2 \sin x$

B) $2 \sin x$

C) 0

D) 2

3. What is the exact value of $\sin \frac{7\pi}{12}$?

A) $\frac{\sqrt{6} + \sqrt{2}}{4}$

B) $\frac{\sqrt{6} - \sqrt{2}}{4}$

C) $\frac{\sqrt{3} + \sqrt{2}}{2}$

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

4. Which is the simplified form of the trigonometric expression $\cot^2 x \sec x + \frac{1}{\cos x}$?

A) $\sin^2 x \cos x$

B) $\sin^2 x + \cos x$

C) $\frac{1}{\sin^2 x} + \frac{1}{\cos x}$

D) $\frac{1}{\sin^2 x \cos x}$

5. Given that $\sin \theta = -\frac{4}{5}$, where $\pi \leq \theta \leq \frac{3\pi}{2}$, what is the exact value of $\cos 2\theta$?

- A) $-\frac{7}{25}$ B) $-\frac{1}{25}$
C) $\frac{1}{25}$ D) $\frac{7}{25}$

6. Solve: $\tan x \cos x = 1$ where $0 \leq x \leq 2\pi$?

- A) $x = 0^\circ$
B) $x = 90^\circ$
C) $x = 180^\circ$
D) no solution

7. Which is the simplified form of the expression $\csc x \tan x \cos^2 x$?

- A) $\sin x$
B) $\cos x$
C) 1
D) $\cos^2 x$

8. Which is the simplified form of the trigonometric expression $\frac{\tan x - \tan x \cos^2 x}{\sin^3 x}$?

- A) $\sec x$
B) $\frac{\cos x}{\sin^2 x}$
C) $\csc x$
D) $\frac{\sin^3 x}{\cos x}$

9. Which is the simplified form of the trigonometric expression $\frac{\csc x - \sin x}{\cot^2 x}$?

- A) $-\tan^2 x$
B) $\frac{1}{1 - \cos x}$
C) $\frac{\cos^4 x}{\sin^3 x}$
D) $\sin x$

Part B: Constructed Response: Show workings to receive full marks.

10. $\angle A$ and $\angle B$ are both in Quadrant II, $\cos A = -\frac{5}{13}$ and $\sin B = \frac{3}{5}$. Determine the exact value of $\cos(A + B)$. (4 marks)

11. Verify the trigonometric identity: $\frac{\sin 2x}{1 - \cos 2x} = \cot x$ (4 marks)

12. Solve: $3 \cos 2x + \cos x = 2$ where $0 \leq x \leq 2\pi$ (4 marks)