

Please circle your intended correct response.

- 1 What are the non-permissible values for the identity

$$\csc x + \cos x = \cot x$$

- A) $x \neq \frac{\pi}{2}n, n \in I$
 B) $x \neq \pi n, n \in I$
 C) $x \neq \frac{\pi}{2} + \frac{\pi}{2}n, n \in I$
 D) $x \neq \frac{\pi}{2} + \pi n, n \in I$

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Which expression should be used to calculate $\cos 75^\circ$?

- A) $\sin 45^\circ \cos 30^\circ + \cos 45^\circ \sin 30^\circ$
 B) $\sin 45^\circ \cos 30^\circ - \cos 45^\circ \sin 30^\circ$
 C) $\cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ$
 D) $\cos 45^\circ \cos 30^\circ - \sin 45^\circ \sin 30^\circ$

- 3 What is the exact value of $\sin \frac{\pi}{8} \bullet \cos \frac{\pi}{8}$?

- A) $\frac{1}{2}$
 B) $\frac{\sqrt{2}}{2}$
 C) $\frac{\sqrt{2}}{4}$
 D) $\sqrt{2}$

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

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

5 What is $\frac{\tan(x) - \tan(x)\cos^2(x)}{\sin^3(x)}$ expressed as a single trigonometric expression?

A) $\cot x$

B) $\csc x$

C) $\sec x$

D) $\tan x$

6 Given that $\cos \theta = \frac{-5}{13}$, where $\frac{\pi}{2} \leq \theta \leq \pi$, what is the exact value of $\cos 2\theta$?

(A) $-\frac{120}{169}$

(B) $-\frac{119}{169}$

(C) $\frac{119}{169}$

(D) $\frac{120}{169}$

7 What is the exact value of $\sin(15^\circ)$?

A) $\frac{\sqrt{2}-\sqrt{6}}{2}$

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

C) $\frac{\sqrt{6}-\sqrt{2}}{2}$

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

8 What are the solutions of $\cos 2x + \sin^2 x = \frac{1}{2}$, $0 \leq \theta \leq 2\pi$?

A) $\frac{\pi}{4}, \frac{7\pi}{4}$

B) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

C) $\frac{\pi}{6}, \frac{5\pi}{6}$

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

Part II

- 1) The $\cos A = -0.5$ and the $\cot B = \sqrt{3}$ where $0 \leq A < \pi$ and $\pi \leq B < 2\pi$. Find the exact value of 4 marks

Either A) $\cos(A-B)$ Or B) $\tan 2A$

- 2) Prove the identity: 4 marks

$$\frac{1 - \sin^2 x}{1 + \cot^2 x} = \sin^2 x \cos^2 x$$

- 3) Simplify fully as a single trig ratio. 4 marks

$$\frac{4}{1 - \sin x} + \frac{4}{1 + \sin x}$$

- 4) Prove $\frac{\sin(2x) - \cos x}{4 \sin^2 x - 1} = \frac{\sin^2 x \cos x + \cos^3 x}{2 \sin x + 1}$ 7 marks

5) Prove $\frac{\sin 2x}{\cos x} + \frac{\cos 2x}{\sin x} = \csc x$

8 marks

6) Either

7 marks

Solve:

Solve the trigonometric equation shown below for $0 \leq x \leq 2\pi$:

$$\sin 3x \cos x - \cos 3x \sin x = -\frac{\sqrt{3}}{2}$$

Or Solve for all x: $\cos(2x) + 1 - \cos x = 0$

End