ULTIMATE MATHEMATICS

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EXAM NO: 1

TRIGONOMETRY.

Each Q Ans 4 Marks) MARKS : 60 TIME : 90 Min

Ans 1 → value of $\sin(780^\circ)\sin(120^\circ) + \cos(-240^\circ)\sin(390^\circ)$ is

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

2 → given $\sin A = \frac{3}{5}$ and $\cos B = \frac{-12}{13}$ where $0 < A < \frac{\pi}{2}$ and $\pi < B < \frac{3\pi}{2}$, then the value of $\tan(A-B)$ is

A) $\frac{63}{16}$ (B) $-\frac{16}{63}$ (C) $\frac{16}{63}$ (D) none of these

3 → which of these is correct?

A) $\tan(70^\circ) = 2\tan(20^\circ) + \tan(50^\circ)$

B) $\tan(70^\circ) = 2\tan(50^\circ) + 2\tan(20^\circ)$

C) $\tan(70^\circ) - 2\tan(50^\circ) = \tan(20^\circ)$

D) $\tan(70^\circ) = \tan(20^\circ) + \tan(70^\circ)$

4 → value of $\sin(10^\circ)\sin(30^\circ)\sin(50^\circ)\sin(70^\circ)$ is

A) $\frac{3}{16}$ (B) $\frac{\sqrt{3}}{16}$ (C) $-\frac{3}{16}$ (D) none of these

5 → value of $\cos(20^\circ)\cos(40^\circ)\cos(60^\circ)\cos(80^\circ)$ is

A) $\frac{1}{8}$ (B) $\frac{1}{16}$ (C) $\frac{3}{16}$ (D) $\frac{\sqrt{3}}{16}$

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Q.No 6 → $\frac{\cos(8A)\cos(5A) - \cos(12A)\cdot\cos(9A)}{\sin(8A)\cos(5A) + \cos(12A)\sin(9A)} = ?$

(A) $\cot(2A)$ (B) $\cot(4A)$ (C) $\tan(2A)$ (D) $\tan(4A)$

Q.No 7 → $\sin A + \sin(2A) + \sin(4A) + \sin(5A) = ?$

(A) $4\cos\left(\frac{A}{2}\right)\cos\left(\frac{3A}{2}\right)\sin\left(\frac{3A}{2}\right)$ (B) $4\cos\left(\frac{A}{2}\right)\cos\left(\frac{3A}{2}\right)\sin(3A)$

(C) $4\cos\left(\frac{A}{2}\right)\cos\left(\frac{3A}{2}\right)\cos(3A)$ (D) none of these

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Q.No 8 → $\cos^4\left(\frac{\pi}{8}\right) + \cos^4\left(\frac{3\pi}{8}\right) + \cos^4\left(\frac{5\pi}{8}\right) + \cos^4\left(\frac{7\pi}{8}\right) = ?$

_____ Fill in the blank

Q.No 9 → $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right) = ?$

(A) $\frac{1}{16}$ (B) $\frac{1}{2}$ (C) $\frac{1}{8}$ (D) $\frac{1}{4}$

Q.No 10 → $\frac{\sin(5x) - 2\sin(3x) + \sin x}{\cos(5x) - \cos x} =$ _____ Fill in the blank

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Q.No 11 → value of $\tan\left(\frac{\pi}{8}\right) =$ _____

(A) $\frac{\sqrt{2}-1}{2}$ (B) $\frac{\sqrt{2}+1}{4}$ (C) $\frac{\sqrt{5}-1}{4}$ (D) none of these

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Q.No 12 → $\tan A + \tan(60^\circ + A) - \tan(60^\circ - A) =$

(A) $\tan(2A)$ (B) $\tan(3A)$ (C) $2\tan(3A)$ (D) $3\tan(3A)$

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Q.N 13 → $(\cos\alpha - \cos\beta)^2 + (\sin\alpha - \sin\beta)^2 = ?$

(A) $4\sin^2\left(\frac{\alpha+\beta}{2}\right)$ (B) $4\sin^2\left(\frac{\alpha-\beta}{2}\right)$ (C) $4\cos^2\left(\frac{\alpha-\beta}{2}\right)$

(D) none of these

Q.N 14 → given $\sin x = -\frac{1}{2}$; x is in 4th quadrant then value of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$, $\tan\frac{x}{2}$ respectively is

(A) $\frac{\sqrt{2-\sqrt{3}}}{2}$, $-\frac{\sqrt{2+\sqrt{3}}}{2}$, $-\frac{\sqrt{2-\sqrt{3}}}{\sqrt{2+\sqrt{3}}}$

(B) $\frac{\sqrt{2-\sqrt{3}}}{2}$, $\frac{\sqrt{2+\sqrt{3}}}{2}$, $2-\sqrt{3}$

(C) $-\frac{\sqrt{2-\sqrt{3}}}{2}$, $\frac{\sqrt{2+\sqrt{3}}}{2}$, $-\sqrt{\frac{2-\sqrt{3}}{2+\sqrt{3}}}$

(D) none of these

Q.N 15 → $\cos(2\theta)\cos\frac{\theta}{2} - \cos(3\theta).\cos\left(\frac{9\theta}{2}\right) = ?$

(A) $\sin(5\theta)\cos\left(\frac{5\theta}{2}\right)$

(B) $\sin\left(\frac{5\theta}{2}\right)\sin(5\theta)$

(C) $\cos\left(\frac{5\theta}{2}\right)\cos(5\theta)$

(D) $\sin(5\theta)\cos\left(\frac{3\theta}{2}\right)$