TRIGONOMETRIC RATIOS

Single Correct Answer Type

1. If $a = \cos 2$ and $b = \sin 7$, then

(A) $a > 0, b > 0$ (B) $\frac{a}{b} < 0$ (C) $a > b$ (D) $a < b$

2. If $\frac{\pi}{2} < \theta < \frac{3\pi}{2}$, then $\frac{\sqrt{1-\sin\theta}}{1+\sin\theta}$ is equal o

(A) $\sec\theta - \tan\theta$ (B) $\sec\theta + \tan\theta$ (C) $\tan\theta - \sec\theta$ (D) $\text{cosec}\theta - \cot\theta$

3. Which one of the following numbers is rational

(A) $\cos 75°$ (B) $\sin 75°$ (C) $\cos 75° \sin 75°$ (D) $\cos 75° \sin 15°$

4. For a positive integer n, let $f_n(\theta) = \left(\tan\frac{\theta}{2}\right)(1+\sec\theta)(1+\sec 4\theta)....\left(1+\sec 2^n\theta\right)$. Then which of the following is correct?

(A) $f_2\left(\frac{\pi}{16}\right) = 0$ (B) $f_3\left(\frac{\pi}{32}\right) = -1$ (C) $f_4\left(\frac{\pi}{64}\right) = \frac{\sqrt{3}}{2}$ (D) $f_5\left(\frac{\pi}{128}\right) = 1$

5. The value of $\tan\frac{\pi}{16} + 2\tan\frac{\pi}{8} + 4$ is equal to

(A) $\tan\frac{3\pi}{8}$ (B) $\tan\frac{7\pi}{16}$ (C) $\tan\frac{7\pi}{16} - 4$ (D) None of these

6. If A and B are two angles satisfying $0 < A, B < \frac{\pi}{2}$ and $A + B = \frac{\pi}{3}$, then the minimum value of $\sec A + \sec B$ is

(A) $\frac{2}{\sqrt{3}}$ (B) $\frac{4}{\sqrt{3}}$ (C) $\frac{1}{\sqrt{3}}$ (D) None of these

7. If $x\sin\theta = y\sin\left(\theta + \frac{2\pi}{3}\right) = z\sin\left(\theta + \frac{4\pi}{3}\right)$, then

(A) $x + y + z = 0$ (B) $xy + yz + zx = 0$ (C) $xyz + x + y + z = 1$ (D) None of these

8. If $2\sin\alpha\cos\beta\sin\gamma = \sin\beta\sin(\alpha + \gamma)$, then $\cot\alpha, \cot\beta$ and $\cot\gamma$ are in

(A) A.P (B) G.P (C) H.P (D) None of these

9. If $x + y + z = \pi$, $\tan x \tan z = 2$ and $\tan y \tan z = 18$, then $\tan^2 z =$

(A) 2 (B) 4 (C) 8 (D) 16

10. The value of $4\sin^2\theta - \cos 2\theta$ lies in the interval

(A) $(-1,5)$ (B) $[-1,5]$ (C) $(-\infty,-1) \cup (5,8)$ (D) None

11. The ratio of the least value of $2 - \cos x + \sin^2 x$ is to its greatest value is

(A) $\frac{4}{7}$ (B) $\frac{4}{11}$ (C) $\frac{4}{13}$ (D) None of these

12. If $x = \frac{2\sin\theta}{1+\cos\theta+\sin\theta}$, then $\frac{1+\sin\theta-\cos\theta}{1+\sin\theta}$ is equal to

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

13. If A is an obtuse angle, then is always equal to $\frac{\sin^3 A - \cos^3 A}{\sin A - \cos A} + \frac{\sin A}{\sqrt{1+\tan^2 A}}$

(A) 1 (B) 2 (C) 3 (D) 4

14. Which of the following is correct?

(A) $\sin 1^\circ > \sin 1$ (B) $\sin 1^\circ < \sin 1$ (C) $\sin 1^\circ = \sin 1$ (D) $\sin 1^\circ = \frac{\pi}{180}\sin 1$

15. The value of $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$ is

(A) 1 (B) 2 (C) 3 (D) 4

16. If $\sin\theta$ and $\cos\theta$ are the roots of the equation $ax^2 - bx + c = 0$, then a, b and c satisfy the relation

(A) $a^2 + b^2 + 2c = 0$ (B) $a^2 - b^2 + 2ac = 0$ (C) $a^2 + c^2 + 2ab = 0$ (D) $a^2 - b^2 - 2ac = 0$

17. If $f(x) = \cos^2 x + \sec^2 x$, then

(A) $f(x) < 1$ (B) $f(x) = 1$ (C) $2 < f(x) < 1$ (D) $f(x) \geq 2$

18. The value of $\cos 12^\circ + \cos 84^\circ + \cos 156^\circ + \cos 132^\circ$ is

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

19. If for real values of x, $\cos\theta = x + \frac{1}{x}$, then

(A) θ is an acute angle (B) θ is a right angle

(C) θ is an obtuse angle (D) no value of θ is possible

20. $\cos\frac{2\pi}{15}\cos\frac{4\pi}{15}\cos\frac{8\pi}{15}\cos\frac{16\pi}{15} =$

(A) $\frac{1}{8}$ (B) $\frac{1}{16}$ (C) $\frac{1}{32}$ (D) $\frac{1}{64}$

Numerical based

21. If $10\sin^4\alpha + 15\cos^4\alpha = 6$. tjem $\frac{27\,\mathrm{cosec}^6\alpha + 8\sec^6\alpha}{10} =$

22. If $\sin\theta + \mathrm{cosec}\,\theta = 2$, then the value of $\sin^{10}\theta + \mathrm{cosec}^{10}\theta$ is

23. If $\sin x + \sin^2 x + \sin^3 x = 1$, then $\cos^6 x - 4\cos^4 x + 8\cos^2 x =$

24. The value of $\sin^6\left(\frac{\pi}{49}\right) + \cos^6\left(\frac{\pi}{49}\right) - 1 + \frac{3}{4}\sin^2\left(\frac{\pi}{49}\right)\cos^2\left(\frac{\pi}{49}\right)$ is equal to

25. The maximum value of $\cos^2\theta - 6\sin\theta\cos\theta + 3\sin^2\theta + 2$ is t, then $[t]$ is ($[.]$ stands for greatest integer)

KEY

1.	B	**2.**	C	**3.**	C	**4.**	D	**5.**	B
6.	B	**7.**	B	**8.**	A	**9.**	D	**10.**	B
11.	C	**12.**	A	**13.**	B	**14.**	B	**15.**	D
16.	B	**17.**	D	**18.**	C	**19.**	D	**20.**	B
21.	25	**22.**	2	**23.**	4	**24.**	0	**25.**	7

→ Wish You all the Best ←