MATHS

BOOKS - KC SINHA MATHS (HINGLISH)

TRIGONOMTERY - PREVIOUS YEAR QUESTIONS - FOR COMPETITION

Exercise

1. The value of $6+(\log)_{3/2}\left(\frac{1}{3\sqrt{2}}\sqrt{\sqrt{4-\frac{1}{3\sqrt{2}}}\sqrt{4-\frac{1}{\sqrt{2}}}\sqrt{4-\frac{1}{3\sqrt{2}}}}\right)$ is .....

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2. Let PQR be a triangle of area Δ with $a=2, b=\frac{7}{2}$ and $c=\frac{5}{2}$, where a, b and c are the lengths of the sides of the triangle opposite to

the angles at P, Q and R respectively. Then $\frac{2\sin P - \sin 2P}{2\sin P + \sin 2P}$ equals

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3. Let $f:(-1,1)\overrightarrow{R}$ be such that $f(\cos 4\theta) = \frac{2}{2-\sec^2\theta}$ for $\theta \in \left(0, \frac{\pi}{4}\right) \cup \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$. Then the value(s) of $f\left(\frac{1}{3}\right)$ is (are) $1-\sqrt{\frac{3}{2}}$ (b) $1+\sqrt{\frac{3}{2}}$ (c) $1-\sqrt{\frac{2}{3}}$ (d) $1+\sqrt{\frac{2}{3}}$

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4. $\tan 9^0 - \tan 27^0 - \tan 63^0 + \tan 81^0$

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5. The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ has

A. infinite number of roots

B. no real roots

C. exactly one real root

D. exactly four real roots

Answer: B

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6. In $\triangle PQR$ if $3\sin P + 4\cos Q = 6$ and $4\sin Q + 3\cos P = 1$ then the angle R is equal to

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7. ABCD is a trapezium such that AB and CD are parallel and $BC \perp CD$. If $\angle ADB = \theta, BC = p and CD = q$, then AB is equal to (1) $\frac{p^2 + q^2\cos\theta}{p\cos\theta + q\sin\theta}$ (2) $\frac{p^2 + q^2}{p^2\cos\theta + q^2\sin\theta}$ (3) $\frac{(p^2 + q^2)\sin\theta}{(p\cos\theta + q\sin\theta)^2}$ (4) $\frac{(p^2 + q^2)\sin\theta}{p\cos\theta + q\sin\theta}$

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8. If x, y, z are in A.P. and $tan^{-1}x, tan^{-1}yandtan^{-1}z$ are also in A.P., then

(1) $2x = 3y = 6z$ (2) $6x = 3y = 2z$ (3) $6x = 4y = 3z$ (4) $x = y = z$

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9. $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = \sec A \cos ecA + 1$

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10. If

$S = \tan^{-1}\left(\frac{1}{n^2 + n + 1}\right) + \tan^{-1}\left(\frac{1}{n^2 + 3n + 3}\right) + \ldots + \tan^{-1}\left(\frac{}{1 + (}\right.$

then tan S is equal to(A)20/(401+20n)(B)n/(n^2+20n+1)(C)n(401+20n)

(D)20/(n^2+n-1)`

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11. The number of solution of the equation $\sin 2\theta - 2\theta\pi + 4\sin\theta\pi = 4 \in [0, 5\pi]$ is equal to 3 (b) 4 (c) 5 (d) 6

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12. The value of $\cot\left(\sum_{n=1}^{2} \cot^{-1}\left(1 + \sum_{k=1}^{n} 2k\right)\right)$ is (a) $\frac{23}{25}$ (b) $\frac{25}{23}$ (c) $\frac{23}{24}$ (d) $\frac{25}{26}$

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13. The number of points in $(-\infty, \infty)$, for which $x^2 - x\sin x - \cos x = 0,$ is 6 (b) 4 (c) 2 (d) 0

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14. In a triangle PQR, P is the largest angle and $\cos P = \frac{1}{3}$. Further the incircle of the triangle touches the sides PQ, QR and RP at N, L and M

respectively, such that the lengths of PN, QL and RM are consecutive even integers. Then possible length(s) of the side(s) of the triangle is (are)

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15. If $3^x = 4^{x-1}$ then x=(A) $\frac{2og_{32}}{2\log_{32} - 1}$ (B) $\frac{2}{2 - \log_{23}}$ (C) $\frac{1}{1 - \log_{43}}$ (D) $\frac{2\log_{23}}{2\log_{23} - 1}$

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