MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 10

Math

1. The solution of dy = cos x $(2 - y \text{ cosec } x)dx$, where $y = \sqrt{2}, \quad \text{when} \quad x = \pi/4$ is

A. $y = \sin x + \frac{1}{2}\cos ecx$

B. $y = \tan(x/2) + \cot(x/2)$

C. $y = (1/\sqrt{2})\sec(x/2) + \sqrt{2}\cos(x/2)$

D. None of the above

Answer: A

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2. Find the domain of the function f given by $f(x) = \frac{1}{\sqrt{[x]^2 - [x] - 6}}$

A. $(-\infty, -2)$

B. $(-\infty, -2) \cup [4, \infty)$

C. $[4, \infty)$

D. $(-\infty, -2] \cup [4, \infty)$

Answer: B

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3. The area of the region (in square units) above the x - axis bounded by the curve $y = \tan x, 0 \leq x \leq \frac{\pi}{2}$ and the tangent to the curve at $x = \frac{\pi}{4}$ is

A. $\frac{1}{2}\left(\log 2 - \frac{1}{2}\right)$

B. $\frac{1}{2}(1 + \log 2)$

C. $\frac{1}{2}(1 - \log 2)$

D. $\frac{1}{2}\left(\log 2 + \frac{1}{2}\right)$

Answer: A

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4. Two men are on the opposite sides of a tower. They measure the angles of elevation of the top of the tower as 45° and 30° respectively. If the height of the tower is 40 m, then the distance between the men is

A. 40 m

B. $40\sqrt{3}m$

C. 68.28 m

D. 109.28 m

Answer: D

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5. Let $C_1, C_2, C_3 \ldots$ are the usual binomial coefficients where $C_r = .^n C_r$. Let $S = C_1 + 2C_2 + 3C_3 + \ldots + nC_n$, then S is equal to

A. $n2^n$

B. 2^{n-1}

C. $n2^{n-1}$

D. 2^{n+1}

Answer: C

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6. If $p = \sin^2 x + \cos^4 x$, then

A. $\frac{3}{4} \leq p \leq 1$

B. $\frac{3}{16} \leq p \leq \frac{1}{4}$

C. $\frac{1}{4} \leq p \leq \frac{1}{2}$

D. None of these

Answer: A

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7. If $p \Rightarrow (q \vee r)$ is false, then the truth values of p, q, r are respectively

A. T, F, F

B. F, T, T

C. F, F, F

D. T, T, F

Answer: A

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8. A box contains tickets numbered 1 to N. n tickets are drawn from the box with replacement. The probability that the largest number on the tickets is k, is

A. $\left(\frac{k}{N}\right)^n$

B. $\left(\frac{k-1}{N}\right)^n$

C. 0

D. None of these

Answer: D

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9. The coordinates of the focus of the parabola described parametrically by $x = 5t^2 + 2. y = 10t + 4$ are

A. (7, 4)

B. (3, 4)

C. $(3, -4)$

D. $(-7, 4)$

Answer: A

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10. The rate of change of $\sqrt{x^2+16}$ with respect to $\frac{x}{x-1}$ at $x=3$ is

A. 2

B. $\frac{11}{5}$

C. $-\frac{12}{5}$

D. -3

Answer: C

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11. If $\left|\frac{z-i}{z+2i}\right|=1, |z|=\frac{5}{2}$ then the value of $|z+3i|$

A. $\sqrt{10}$

B. $\frac{7}{2}$

C. $\frac{15}{4}$

D. $2\sqrt{3}$

Answer: B

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12. Let a,b,c are respectively the sums of the first n terms, the next n terms and the next n terms of a GP. Show that a,b,c are in GP.

A. arithmetic progression

B. geometric progression

C. harmonic progression

D. none of these

Answer: B

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13. The function $f(x) = \{x\}\sin(\pi[x])$, where [.] denotes the greatest integer function and {.} is the fractional part function, is discontinuous at

A. all x

B. all integer points

C. no x

D. x which is not an integer

Answer: C

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14. There are number of seats and m number of people have to be seated, then how many ways are possible to do this $(m < n)$?

A. $.^{n}P_{m}$

B. $.^{n}C_{m}$

C. $.^{n} C_{n} \times (m-1)!$

D. $.^{n-1} P_{m-1}$

Answer: A

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15. Let $I = \int_0^1 \frac{\sin}{\sqrt{x}} dx \text{and} J = \int_0^1 \frac{\cos x}{\sqrt{x}} dx$ Then which one of the following is true?

A. $I > \frac{2}{3}$ and $J < 2$

B. $I > \frac{2}{3}$ and $J > 2$

C. $I < \frac{2}{3}$ and $J < 2$

D. $I > \frac{2}{3}$ and $J > 2$

Answer: C

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16. If $\begin{vmatrix} a^2 & b^2 & c^2 \\ (a+\lambda)^2 & (b+\lambda)^2 & (c+\lambda)^2 \\ (a-\lambda)^2 & (b-\lambda)^2 & (c-\lambda)^2 \end{vmatrix} = k\lambda \begin{vmatrix} a^2 & b^2 & c^2 \\ a & b & c \\ 1 & 1 & 1 \end{vmatrix} \lambda \neq 0$ then k is equal to :

A. $4\lambda abc$

B. $-4\lambda^2$

C. $4\lambda^2$

D. $-4\lambda abc$

Answer: C

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17. Coefficent of variation of two distributions are 60% and 75%, and their standard deviations are 18 and 15 respectively. Find their arithmetic means.

A. 30, 30

B. 30, 20

C. 20, 30

D. 20, 20

Answer: B

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18. $\{x \in R : \cos 2x + 2\cos^2 x = 2\}$ is equal to

A. $\left\{2n\pi + \frac{\pi}{3} : n \in Z\right\}$

B. $\left\{n\pi \pm \frac{\pi}{6} : n \in Z\right\}$

C. $\left\{n\pi + \frac{\pi}{3} : n \in Z\right\}$

D. $\left\{2n\pi - \frac{\pi}{3} : n \in Z\right\}$

Answer: B

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19. $\lim_{x \to 0} \frac{\ln(1+x)}{x^2} + \frac{x-1}{x} =$

A. ∞

B. $\frac{1}{2}$

C. $-\frac{1}{2}$

D. 1

Answer: B

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20. The abscissa of the points, where the tangent to curve $y = x^3 - 3x^2 - 9x + 5$ is parallel to X-axis are

A. x = 0

B. x = 1 and -1

C. x = 1 and -3

D. $x = -1$ and 3

Answer: D

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21. The value of $x, \forall x \in R$ which satisfy the equation $(x-1)\left|x^2-4x+3\right|+2x^2+3x-5=0$ is

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22. Let $f(x)=\frac{9x}{25}+c, c>0$. If the curve $y=f^{-1}(x)$ passes through $\left(\frac{1}{4}, -\frac{5}{4}\right)$ and g(x) is the antiderivative of $f^{-1}(x)$ such that $g(0)=\frac{5}{2}$, then the value of $[g(1)]$ is, (where [.] represents the greatest integer function)

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23. Let $x + \frac{1}{x} = 2, y + \frac{1}{y} = -2$ and $\sin^{-1} x + \cos^{-1} y = m\pi$, then the value of m is

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24. If $\hat{i} \times \left[\left(\vec{a} - \hat{j}\right) \times \hat{i}\right] + \hat{j} \times \left[\left(\vec{a} - \hat{k}\right) \times \hat{j}\right] + \hat{k} \times \left[\left(\vec{a} - \hat{i}\right) \times \hat{k}\right] = 0$ and $\vec{a} = x\hat{i} + y\hat{j} + z\hat{k}$, then find the value of $8\left(x^3 - xy + zx\right)$

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25. A circle touches the hypotenuse of a right angled triangle at its middle point and passes through the middle point of shorter side. If 3 unit and 4 unit be the length of the sides and 'r be the radius of the circle, then find the value of3r

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