



## MATHS

### BOOKS - NTA MOCK TESTS

#### JEE MOCK TEST 10

#### Math

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

A.  $y = \sin x + \frac{1}{2} \operatorname{cosec} x$

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  $45^\circ$  and  $30^\circ$  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  $C_1, C_2, C_3, \dots$  are the usual binomial coefficients where  $C_r = {}^n C_r$ . Let  $S = C_1 + 2C_2 + 3C_3 + \dots + nC_n$ , 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  $\{x\}$  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  $I = \int_0^1 \frac{\sin x}{\sqrt{x}} dx$  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. Coefficient 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.  $\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x^2} + \frac{x-1}{x} =$

A.  $\infty$

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  $(x - 1)|x^2 - 4x + 3| + 2x^2 + 3x - 5 = 0$  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

$$\hat{i} \times [(\vec{a} - \hat{j}) \times \hat{i}] + \hat{j} \times [(\vec{a} - \hat{k}) \times \hat{j}] + \hat{k} \times [(\vec{a} - \hat{i}) \times \hat{k}] = 0$$

and  $\vec{a} = x\hat{i} + y\hat{j} + z\hat{k}$ , then find the value of  $8(x^3 - xy + zx)$

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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 of  $3r$





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