



## MATHS

### BOOKS - NTA MOCK TESTS

#### NTA JEE MOCK TEST 28

#### Mathematics

1. The area of the region enclosed by  $f(x) = \frac{-2x}{e^x}$  and the x - axis is

- A. 1 sq.units
- B. 2 sq.units
- C.  $\frac{1}{2}$  sq. units
- D. not defined

**Answer: B**



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2. Let  $x_1, x_2, x_3, \dots, x_k$  be  $k$  observations and  $w_i = ax_i + b$  for  $i = 1, 2, 3, \dots, K$ , where  $a$  and  $b$  are constants. If mean of  $x_i$  is 52 and their standard deviation is 12 and mean of  $w_i$  is 60 and their standard deviation is 15, then the value of  $a$  and  $b$  should be

A.  $a = 1.25, b = -5$

B.  $a = -1.25, b = 5$

C.  $a = 2.5, b = -5$

D.  $a = 2.5, b = 5$

**Answer: A**



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3. For real values of  $x$ , the value of expression  $\frac{11x^2 - 12x - 6}{x^2 + 4x + 2}$

- A. lies between -17 and -3
- B. does not lie between  $-17$  and  $-3$
- C. lies between 3 and 17
- D. does not lie between 17 and 3

**Answer: B**



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4. Two distinct numbers are chosen from 1,3,5,7 ..... 151,153,155 and multiplied . The probability that the product is a multiple of 5 is

- A.  $\frac{1020}{3003}$
- B.  $\frac{1112}{3003}$

C.  $\frac{1011}{3003}$

D.  $\frac{1122}{3003}$

**Answer: B**



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5. If  $f(x)$  is a twice differentiable function such that  $f''(x) = -f$ ,  $f'(x) = g(x)$ ,  $h(x) = f^2(x) + g^2(x)$  and  $h(10) = 10$ , then  $h(5)$  is equal to

A. 5

B. 15

C. 10

D. 17

**Answer: C**





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6. The minimum value of  $|3z - 3| + |2z - 4|$  equal to

A. 2

B. 1.5

C. 3

D. 1

Answer: A



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7. If  $\lim_{x \rightarrow 0} (1 + px + qx^2)^{\operatorname{cosec}x} = e^5$ , then

A.  $p = 5, q \in R$

B.  $p = 5, q > R$

C.  $p = 5, q \in R$

D.  $q = 5, p = 0$

**Answer: A**

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8. If  $\int e^{\sin \theta} (\sin \theta + \sec^2 \theta) d\theta$  is equal to  $f(\theta) + C$  (where , C is the constant of integration) and  $f(0) = 0$  , then the value of  $f\left(\frac{\pi}{4}\right)$  is

A.  $e^{\sqrt{2}}$

B.  $e^{\frac{1}{\sqrt{2}}}$

C.  $e^2$

D.  $e^{\frac{1}{2}}$

**Answer: B**

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9. A curve passing through the point (1,2) and satisfying the condition that slope of the normal at any abscissa of that point , then the curve also passes through the point

A. (0,0)

B. (2,2)

C. (2,1)

D. (3,2)

**Answer: C**



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10. The coefficient of  $x^8$  in the expansion of  $\left(1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \frac{x^8}{8!}\right)^2$  is

A.  $\frac{1}{135}$

B.  $\frac{2}{315}$

C.  $\frac{3}{105}$

D.  $\frac{1}{210}$

**Answer: A**



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**11.** Let P and Q be two points on the curves  $x^2 + y^2 = 2$  and  $\frac{x^2}{8} + \frac{y^2}{4} = 1$  respectively. Then the minimum value of the length PQ is

A. 1

B.  $2 - \sqrt{2}$

C.  $2\sqrt{2}$



D.  $\sqrt{2}$

**Answer: B**

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12. Let orthocentre of  $\triangle ABC$  is  $(4,6)$ . If  $A = (4, 7)$  and  $B = (-2, 4)$ , then coordinates of vertex C is

A.  $(5,4)$

B.  $(4,5)$

C.  $(-5,-4)$

D.  $(-4,-5)$

**Answer: A**

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13. The area bounded by the curve

$y = \left| \cos^{-1}(\sin x) \right| + \left| \frac{\pi}{2} - \cos^{-1}(\cos x) \right|$  and the x - axis , where  $\frac{\pi}{2} \leq x \leq \pi$ , is equal to

A.  $\pi^2$

B.  $\frac{\pi^2}{2}$

C.  $\frac{\pi^2}{8}$

D.  $\frac{\pi^2}{4}$

**Answer: D**

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14. Let  $\oplus$  and  $\otimes$  are two mathematical operators . If  $p \oplus (q \otimes r)$  is equivalent to  $((p \wedge q) \Rightarrow r)$  , then  $\oplus$  and  $\otimes$

A. can be  $\vee$  and  $\wedge$  respectively

B. can be  $\wedge$  and  $\vee$  respectively

C. can both be  $\Rightarrow$

D. can be  $\Rightarrow$  and  $\Leftrightarrow$  respectively

**Answer: C**



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**15.** The point of intersection of the plane  $3x - 5y + 2z = 6$  with the straight line passing through the origin and perpendicular to the plane  $2x - y - z = 4$  is

A. (1,-1,-1)

B. (-1,-1,2)

C. (4,2,2)

D.  $\left(\frac{4}{3}, \frac{-2}{3}, \frac{-2}{3}\right)$

Answer: D

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16. If  $D_r = \begin{vmatrix} r & 15 & 8 \\ r^2 & 35 & 9 \\ r^3 & 25 & 10 \end{vmatrix}$ , then the value of

$\sqrt[5]{\left(\left(-\frac{1}{100}\right)\sum_{r=1}^5 D_r\right) - 37}$  is equal to

A. 5

B. 2

C. 9

D. 3

Answer: D

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17. Let  $I_1 = \int_0^1 e^{x^2} dx$  and  $I_2 = \int_0^{12} 2^{x^2} e^{x^2} dx$  then the value of  $I_1 + I_2$  is equal to

A. 1

B. 2

C. e

D.  $e^2$

**Answer: C**

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18. A pair of tangents are drawn from a point P to the circle  $x^2 + y^2 = 1$ . If the tangents make an intercept of 2 on the line  $x=1$  then the locus of P is

A.  $y^2 = 2(x + 1)$

B.  $2y^2 = -(x + 1)$

C.  $y^2 = 2(x - 1)$

D.  $y^2 = -2x + 1$

**Answer: A**



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19. Tangents to the parabola  $y^2 = 4ax$  at  $P(at_1^2, 2at_1)$  and  $Q(at_2^2, 2at_2)$  meet at T. If  $\Delta PTQ$  is right - angled at T, then  $\frac{1}{PS} + \frac{1}{QS}$  is equal to (where , S is the focus of the given parabola)

A.  $\frac{1}{a}$

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

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

D.  $\frac{1}{4a}$

Answer: A



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20. The value of  $\int_{-1}^1 \cot^{-1} \left( \frac{x + x^3 + x^5}{x^4 + x^2 + 1} \right) dx$  is equal to

A.  $\frac{\pi}{2}$

B.  $\frac{\pi}{4}$

C.  $\frac{3\pi}{4}$

D.  $\pi$

Answer: D



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21. Let  $\vec{U} = \hat{i}, \hat{j}, \vec{V} = \hat{i} - \hat{j}$  and  $\vec{W} = 3\hat{i} + 5\hat{j} + 3\hat{k}$ . If  $\hat{n} = 0$  then  $\left| \vec{W} \cdot \hat{n} \right|$  is equal to

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22. Consider the function  $f(x) = \max \{|\sin x|, |\cos x|\}, \forall x \in [0, 3\pi]$ . if  $\lambda$  is the number of points at which  $f(x)$  is non - differentiable , then value of  $\frac{\lambda^3}{5}$  is

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23. If the roots of the equation  $10x^3 - cx^2 = 54x - 27 = 0$  are in harmonic progression the value of  $c$  is

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24. If the normal to the ellipse  $\frac{x^2}{25} + \frac{y^2}{1} = 1$  is at a distance  $p$  from the origin then the maximum value of  $p$  is

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25. If  $A = \begin{bmatrix} 2 & 3 \\ -1 & -2 \end{bmatrix}$  and  $B = \sum_{r=1}^{10} A^r$ , then the value of det

(B) is equal to



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