

JEE Main April 2025
Question Paper With Text Solution
03 April | Shift-1

MATHEMATICS



JEE Main & Advanced | XI-XII Foundation | VI-X Pre-Foundation

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**JEE MAIN APRIL 2025 | 03RD APRIL SHIFT-1****SECTION – A**

Question ID : 347577527

1. If the domain of the function $f(x) = \log_e \left(\frac{2x-3}{5+4x} \right) + \sin^{-1} \left(\frac{4+3x}{2-x} \right)$ is $[\alpha, \beta]$, then $\alpha^2 + 4\beta$ is equal to :
- (1) 5 (2) 3 (3) 7 (4) 4

Ans. Official answer NTA(4)**Sol.**

Question ID : 347577539

2. Line L_1 passes through the point $(1, 2, 3)$ and is parallel to z-axis. Line L_2 passes through the point $(\lambda, 5, 6)$ and is parallel to y-axis. Let for $\lambda = \lambda_1, \lambda_2, \lambda_2 < \lambda_1$, the shortest distance between the two lines be 3. Then the square of the distance of the point $(\lambda_1, \lambda_2, 7)$ from the line L_1 is :
- (1) 32 (2) 40 (3) 37 (4) 25

Ans. Official answer NTA(4)**Sol.**

Question ID : 347577530

3. Let A be a matrix of order 3×3 and $|A| = 5$. If $|2\text{adj}(3A \text{adj}(2A))| = 2^\alpha \cdot 3^\beta \cdot 5^\gamma$, $\alpha, \beta, \gamma \in \mathbb{N}$, then $\alpha + \beta + \gamma$ is equal to :
- (1) 28 (2) 27 (3) 26 (4) 25

Ans. Official answer NTA(2)**Sol.**

Question ID : 347577531

4. Let $a_1, a_2, a_3, \dots$ be a G.P. of increasing positive numbers. If $a_3 a_5 = 729$ and $a_2 + a_4 = \frac{111}{4}$, then $24(a_1 + a_2 + a_3)$ is equal to :
- (1) 131 (2) 128 (3) 129 (4) 130

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Ans. Official answer NTA (3)

Sol.

Question ID : 347577526

5. Let $A = \{-3, -2, -1, 0, 1, 2, 3\}$. Let R be a relation on A defined by xRy if and only if $0 \leq x^2 + 2y \leq 4$. Let l be the number of elements in R and m be the minimum number of elements required to be added in R to make it a reflexive relation. Then $l + m$ is equal to :

- (1) 20 (2) 17 (3) 19 (4) 18

Ans. Official answer NTA (4)

Sol.

Question ID : 347577538

6. A line passes through the origin and makes equal angles with the positive coordinate axes. It intersects the lines $L_1 : 2x + y + 6 = 0$ and $L_2 : 4x + 2y - p = 0, p > 0$, at the points A and B , respectively. If $AB = \frac{9}{\sqrt{2}}$ and the foot of the perpendicular from the point A on the line L_2 is M , then $\frac{AM}{BM}$ is equal to :

- (1) 3 (2) 5 (3) 2 (4) 4

Ans. Official answer NTA (1)

Sol.

Question ID : 347577537

7. A line passing through the point $P(\sqrt{5}, \sqrt{5})$ intersects the ellipse $\frac{x^2}{36} + \frac{y^2}{25} = 1$ at A and B such that $(PA) \cdot (PB)$ is maximum. Then $5(PA^2 + PB^2)$ is equal to :

- (1) 338 (2) 377 (3) 290 (4) 218

Ans. Official answer NTA (1)

Sol.



Question ID : 347577542

8. Let $f(x) = \begin{cases} (1+ax)^{\frac{1}{x}} & , x < 0 \\ 1+b & , x = 0 \\ \frac{(x+4)^{\frac{1}{2}} - 2}{(x+c)^{\frac{1}{3}} - 2} & , x > 0 \end{cases}$

be continuous at $x = 0$. Then e^{abc} is equal to :

(1) 64

(2) 36

(3) 72

(4) 48

Ans. Official answer NTA (4)**Sol.**

Question ID : 347577544

9. Let the domain of the function $f(x) = \log_2 \log_4 \log_6 (3 + 4x - x^2)$ be (a, b) . If $\int_0^{b-a} [x^2] dx = p - \sqrt{q} - \sqrt{r}$, $p, q, r \in \mathbb{N}$, $\gcd(p, q, r) = 1$, where $[\cdot]$ is the greatest integer function, then $p + q + r$ is equal to :

(1) 11

(2) 10

(3) 8

(4) 9

Ans. Official answer NTA (2)**Sol.**

Question ID : 347577535

10. The number of solutions of the equation $2x + 3 \tan x = \pi$, $x \in [-2\pi, 2\pi] - \left\{ \pm \frac{\pi}{2}, \pm \frac{3\pi}{2} \right\}$ is :

(1) 6

(2) 5

(3) 3

(4) 4

Ans. Official answer NTA (2)**Sol.**



Question ID : 347577532

11. The sum $1 + 3 + 11 + 25 + 45 + 71 + \dots$ upto 20 terms, is equal to :

- (1) 6982 (2) 7240 (3) 8124 (4) 7130

Ans. Official answer NTA(2)**Sol.**

Question ID : 347577543

12. Let $f(x) = \int x^3 \sqrt{3-x^2} dx$. If $5f(\sqrt{2}) = -4$, then $f(1)$ is equal to :

- (1) $-\frac{2\sqrt{2}}{5}$ (2) $-\frac{6\sqrt{2}}{5}$ (3) $-\frac{8\sqrt{2}}{5}$ (4) $-\frac{4\sqrt{2}}{5}$

Ans. Official answer NTA(2)**Sol.**

Question ID : 347577534

13. The sum of all rational terms in the expansion of $(2 + \sqrt{3})^8$ is :

- (1) 18817 (2) 33845 (3) 16923 (4) 3763

Ans. Official answer NTA(1)**Sol.**

Question ID : 347577540

14. Let a line passing through the point $(4, 1, 0)$ intersect the line $L_1 : \frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ at the point $A(\alpha, \beta, \gamma)$

and the line $L_2 : x - 6 = y = -z + 4$ at the point $B(a, b, c)$. Then $\begin{vmatrix} 1 & 0 & 1 \\ \alpha & \beta & \gamma \\ a & b & c \end{vmatrix}$ is equal to :

- (1) 6 (2) 8 (3) 16 (4) 12

Ans. Official answer NTA(2)**Sol.****MATRIX JEE ACADEMY****Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911****Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in**



Question ID : 347577536

15. The radius of the smallest circle which touches the parabolas $y = x^2 + 2$ and $x = y^2 + 2$ is :

- (1) $\frac{7\sqrt{2}}{2}$ (2) $\frac{7\sqrt{2}}{8}$ (3) $\frac{7\sqrt{2}}{4}$ (4) $\frac{7\sqrt{2}}{16}$

Ans. Official answer NTA(2)**Sol.**

Question ID : 347577529

16. Let $z \in \mathbb{C}$ be such that $\frac{z^2 + 3i}{z - 2 + i} = 2 + 3i$. Then the sum of all possible values of z^2 is :

- (1) $-19 + 2i$ (2) $-19 - 2i$ (3) $19 - 2i$ (4) $19 + 2i$

Ans. Official answer NTA(2)**Sol.**

Question ID : 347577545

17. Let g be a differentiable function such that $\int_0^x g(t) dt = x - \int_0^x tg(t) dt$, $x \geq 0$ and let $y = y(x)$ satisfy the differentialequation $\frac{dy}{dx} - y \tan x = 2(x+1) \sec x g(x)$, $x \in \left[0, \frac{\pi}{2}\right)$. If $y(0) = 0$, then $y\left(\frac{\pi}{3}\right)$ is equal to :

- (1) $\frac{2\pi}{3\sqrt{3}}$ (2) $\frac{4\pi}{3\sqrt{3}}$ (3) $\frac{4\pi}{3}$ (4) $\frac{2\pi}{3}$

Ans. Official answer NTA(3)**Sol.**

Question ID : 347577541

18. If $y(x) = \begin{vmatrix} \sin x & \cos x & \sin x + \cos x + 1 \\ 27 & 28 & 27 \\ 1 & 1 & 1 \end{vmatrix}$, $x \in \mathbb{R}$, then $\frac{d^2y}{dx^2} + y$ is equal to :

- (1) -1 (2) 28 (3) 27 (4) 1

Ans. Official answer NTA(1)**MATRIX JEE ACADEMY****Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911****Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in**

Sol.

Question ID : 347577528

19. Let α and β be the roots of $x^2 + \sqrt{3}x - 16 = 0$, and γ and δ be the roots of $x^2 + 3x - 1 = 0$. If $P_n = \alpha^n + \beta^n$ and $Q_n = \gamma^n + \delta^n$, then $\frac{P_{25} + \sqrt{3}P_{24}}{2P_{23}} + \frac{Q_{25} - Q_{23}}{Q_{24}}$ is equal to :

- (1) 4 (2) 7 (3) 5 (4) 3

Ans. Official answer NTA(3)**Sol.**

Question ID : 347577533

20. If $\sum_{r=1}^9 \left(\frac{r+3}{2^r}\right)^9 C_r = \alpha \left(\frac{3}{2}\right)^9 - \beta$, $\alpha, \beta \in \mathbb{N}$, then $(\alpha + \beta)^2$ is equal to :

- (1) 27 (2) 81 (3) 18 (4) 9

Ans. Official answer NTA(2)**Sol.****SECTION - B**

Question ID : 347577549

21. Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 3\hat{i} + 2\hat{j} - \hat{k}$, $\vec{c} = \lambda\hat{j} + \mu\hat{k}$ and $\hat{d}$ be a unit vector such that $\vec{a} \times \hat{d} = \vec{b} \times \hat{d}$ and $\vec{c} \cdot \hat{d} = 1$. If $\vec{c}$ is perpendicular to $\vec{a}$, then $|3\lambda\hat{d} + \mu\vec{c}|^2$ is equal to _____.

Ans. Official answer NTA(5)**Sol.**

Question ID : 347577546

22. If the number of seven-digit numbers, such that the sum of their digits is even, is $m \cdot n \cdot 10^n$; $m, n \in \{1, 2, 3, \dots, 9\}$, then $m + n$ is equal to _____.

Ans. Official answer NTA(14)**Sol.****MATRIX JEE ACADEMY****Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911****Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in**



Question ID : 347577548

23. Let the product of the focal distances of the point $P(4, 2\sqrt{3})$ on the hyperbola $H: \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be 32. Let the length of the conjugate axis of H be p and the length of its latus rectum be q . Then $p^2 + q^2$ is equal to _____.

Ans. Official answer NTA (120)**Sol.**

Question ID : 347577550

24. The area of the region bounded by the curve $y = \max\{|x|, |x-2|\}$, the x -axis and the lines $x = -2$ and $x = 4$ is equal to _____.

Ans. Official answer NTA (12)**Sol.**

Question ID : 347577547

25. All five letter words are made using all the letters A, B, C, D, E and arranged as in an English dictionary with serial numbers. Let the word at serial number n be denoted by W_n . Let the probability $P(W_n)$ of choosing the word W_n satisfy $P(W_n) = 2P(W_{n-1})$, $n > 1$. If $P(CDBEA) = \frac{2^\alpha}{2^\beta - 1}$, $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to _____.

Ans. Official answer NTA (183)**Sol.**