

JEE Main April 2026
Question Paper With Text Solution
02 April | Shift-2

MATHEMATICS



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

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**JEE MAIN APRIL 2026 | 2ND APRIL SHIFT-2****SECTION – A**

Question ID : 691121151

1. Let α, β be the roots of the equation $x^2 - 3x + r = 0$ and $\frac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 + 3x + r = 0$.

If the roots of the equation $x^2 + 6x = m$ are $2\alpha + \beta + 2r$ and $\alpha - 2\beta - \frac{r}{2}$, then m is equal to:

- (1) -135 (2) -567 (3) 135 (4) 567

Ans. (4)**Sol.**

Question ID : 691121152

2. Let the circles $C_1 : |z| = r$ and $C_2 : |z - 3 - 4i| = 5, z \in \mathbf{C}$, be such that C_2 lies within C_1 . If z_1 moves on C_1 , z_2 moves on C_2 and $\min |z_1 - z_2| = 2$, then $\max |z_1 - z_2|$ is equal to :

- (1) 12 (2) 17 (3) 22 (4) 24

Ans. (3)**Sol.**

Question ID : 691121153

3. If the system of equations

$$\begin{aligned}x + 5y + 6z &= 4, \\2x + 3y + 4z &= 7, \\x + 6y + az &= b\end{aligned}$$

has infinitely many solutions, then the point (a, b) lies on the line :

- (1) $y - x = 3$ (2) $x - y = 3$ (3) $x + y = 11$ (4) $x + y = 12$

Ans. (2)**Sol.**



Question ID : 691121154

4. Let a_1, a_2, a_3, \dots be an A.P. and $g_1 = a_1, g_2, g_3, \dots$ be an increasing G.P. If $a_1 = a_2 + g_2 = 1$ and $a_3 + g_3 = 4$, then $a_{10} + g_5$ is equal to :

- (1) 81 (2) 76 (3) 62 (4) 55

Ans. (4)**Sol.**

Question ID : 691121155

5. The sum $\frac{1^3}{1} + \frac{1^3 + 2^3}{1+3} + \frac{1^3 + 2^3 + 3^3}{1+3+5} + \dots$ up to 8 terms, is :

- (1) 70 (2) 71 (3) 72 (4) 73

Ans. (2)**Sol.**

Question ID : 691121156

6. If for $3 \leq r \leq 30$, $\binom{30}{30-r} + 3\binom{30}{31-r} + 3\binom{30}{32-r} + \binom{30}{33-r} = {}^m C_r$ then m equals :

- (1) 31 (2) 32 (3) 33 (4) 34

Ans. (3)**Sol.**

Question ID : 691121157

7. Let P_n denote the total number of triangles formed by joining the vertices of an n -side regular polygon. If

$P_{n+1} - P_n = 66$ then the sum of all distinct prime divisors of n is :

- (1) 7 (2) 8 (3) 5 (4) 6

Ans. (3)**Sol.**



Question ID : 691121158

8. A man throws a fair coin repeatedly. He gets 10 points for each head he throws and 5 points for each tail he throws. If the probability that he gets exactly 30 points is $\frac{m}{n}$ where $\gcd(m, n) = 1$, then $m + n$ is equal to :

- (1) 53 (2) 55 (3) 107 (4) 105

Ans. (3)**Sol.**

Question ID : 691121159

9. The mean and variance of n observations are 8 and 16, respectively. If the sum of the first $(n - 1)$ observations is 48 and the sum of squares of the first $(n - 1)$ observations is 496, then the value of n is :

- (1) 21 (2) 16 (3) 13 (4) 7

Ans. (4)**Sol.**

Question ID : 691121160

10. Let a circle pass through the origin and its centre be the point of intersection of two mutually perpendicular lines $x + (k - 1)y + 3 = 0$ and $2x + k^2y - 4 = 0$. If the line $x - y + 2 = 0$ intersects the circle at the points A and B, then $(AB)^2$ is equal to :

- (1) 10 (2) 27 (3) 18 (4) 34

Ans. (3)**Sol.**

Question ID : 691121161

11. Let O be the origin, and P and Q be two points on the rectangular hyperbola $xy = 12$ such that the mid point of the line segment PQ is $\left(\frac{1}{2}, -\frac{1}{2}\right)$. Then the area of the triangle OPQ equals :

- (1) $\frac{3}{2}$ (2) $\frac{5}{2}$ (3) $\frac{7}{2}$ (4) $\frac{9}{2}$

Ans. (3)

**Sol.**

Question ID : 691121162

12. Let the parabola $y = x^2 + px + q$ passing through the point $(1, -1)$ be such that the distance between its vertex and the x-axis is minimum. Then the value of $p^2 + q^2$ is :

- (1) 2 (2) 4 (3) 5 (4) 8

Ans. (2)**Sol.**

Question ID : 691121163

13. Let $P = \{\theta \in [0, 4\pi] : \tan^2\theta \neq 1\}$ and $S = \{a \in \mathbf{Z} : 2(\cos^8\theta - \sin^8\theta) \sec 2\theta = a^2, \theta \in P\}$. Then $n(S)$ is :

- (1) 0 (2) 1 (3) 2 (4) 3

Ans. (1)**Sol.**

Question ID : 691121164

14. Let the vectors $\vec{a} = -\hat{i} + \hat{j} + 3\hat{k}$ and $\vec{b} = \hat{i} + 3\hat{j} + \hat{k}$. For some $\lambda, \mu \in \mathbf{R}$, let $\vec{c} = \lambda\vec{a} + \mu\vec{b}$. If $\vec{c} \cdot (3\hat{i} - 6\hat{j} + 2\hat{k}) = 10$ and $\vec{c} \cdot (\hat{i} + \hat{j} + \hat{k}) = -2$, then $|\vec{c}|^2$ is equal to :

- (1) 8 (2) 12 (3) 14 (4) 15

Ans. (2)**Sol.**

Question ID : 691121165

15. Let the point A be the foot of perpendicular drawn from the point $P(a, b, 0)$ on the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-\alpha}{3}$.

If the midpoint of the line segment PA is $\left(0, \frac{3}{4}, \frac{-1}{4}\right)$ then the value of $a^2 + b^2 + \alpha^2$ is equal to :

- (1) 1 (2) 2 (3) 6 (4) 9

Ans. (1)

**Sol.**

Question ID : 691121166

16. Two adjacent sides of a parallelogram PQRS are given by $\overrightarrow{PQ} = \hat{j} + \hat{k}$ and $\overrightarrow{PS} = \hat{i} - \hat{j}$. If the side PS is rotated about the point P by an acute angle α in the plane of the parallelogram so that it becomes perpendicular to the side PQ, then $\sin^2\left(\frac{5\alpha}{2}\right) - \sin^2\left(\frac{\alpha}{2}\right)$ is equal to :

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

Ans. (2)**Sol.**

Question ID : 691121167

17. The value of $\int_0^{20\pi} (\sin^4 x + \cos^4 x) dx$ is equal to :

- (1) $\frac{15\pi}{2}$ (2) 25π (3) 15π (4) $\frac{25\pi}{2}$

Ans. (3)**Sol.**

Question ID : 691121168

18. Let $f(x)$ be a polynomial of degree 5, and have extrema at $x = 1$ and $x = -1$. If $\lim_{x \rightarrow 0} \left(\frac{f(x)}{x^3} \right) = -5$, then $f(2) - f(-2)$ is equal to :

- (1) 0 (2) 50 (3) 92 (4) 112

Ans. (4)**Sol.**



Question ID : 691121169

19. Let $f(x) = \int \left(\frac{16x+24}{x^2+2x-15} \right) dx$. If $f(4) = 14 \log_e 3$ and $f(7) = \log_e (2^\alpha \cdot 3^\beta)$, $\alpha, \beta \in \mathbf{N}$, then $\alpha + \beta$ is equal to:

(1) 31

(2) 37

(3) 39

(4) 41

Ans. (3)**Sol.**

Question ID : 691121170

20. Let $x = x(y)$ be the solution of the differential equation $2y^2 \frac{dx}{dy} - 2xy + x^2 = 0$, $y > 1$, $x(e) = e$. Then $x(e^2)$ is

equal to :

(1) $\frac{3}{2}e^2$ (2) $\frac{2}{3}e^2$ (3) e^2 (4) $2e^2$ **Ans.** (2)**Sol.****SECTION - B**

Question ID : 691121171

21. Let $A = \{2, 3, 4, 5, 6\}$. Let R be a relation on the set $A \times A$ given by $(x, y)R(z, w)$ if and only if x divides z and $y \leq w$. Then the number of elements in R is _____.

Ans. (120)**Sol.**

Question ID : 691121172

22. Consider the matrices $A = \begin{bmatrix} 2 & -2 \\ 4 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 9 \\ 1 & 3 \end{bmatrix}$. If matrices P and Q are such that $PA = B$ and $AQ = B$

then the absolute value of the sum of the diagonal elements of $2(P + Q)$ is _____.**Ans.** (34)**Sol.****MATRIX JEE ACADEMY****Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911****Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in**



Question ID : 691121173

23. Let A be the point (3, 0) and circles with variable diameter AB touch the circle $x^2 + y^2 = 36$ internally. Let the curve C be the locus of the point B. If the eccentricity of C is e, then $72e^2$ is equal to _____.

Ans. (18)**Sol.**

Question ID : 691121174

24. If the area of the region bounded by $16x^2 - 9y^2 = 144$ and $8x - 3y = 24$ is A, then $3(A + 6 \log_e(3))$ is equal to _____.

Ans. (24)**Sol.**

Question ID : 691121175

25. The number of points in the interval [2, 4], at which the function $f(x) = \left[x^2 - x - \frac{1}{2} \right]$, where $[\cdot]$ denotes the greatest integer function, is discontinuous, is _____.

Ans. (10)**Sol.**