

JEE MAIN STRAIGHT LINES — PYQs

Max. Marks: 252

Questions: 63

Section A (MCQ) — 51 questions

Q.1 If a straight line drawn through the point of intersection of the lines $4x + 3y - 1 = 0$ and $3x + 4y - 1 = 0$, meets the co-ordinate axes at the points P and Q, then the locus of the mid point of PQ is : [JEE Main 2026 (Online) 8th April Evening Shift]

- (1) $x + y - 7 = 0$ (2) $x + y - 14xy = 0$
 (3) $2x + y + 14xy = 0$ (4) $x + 2y - 14xy = 0$

Scan or tap for the full solution



Q.2 In an equilateral triangle PQR, let the vertex P be at (3, 5) and the side QR be along the line $x + y = 4$. If the orthocentre of the triangle PQR is (α, β) , then $9(\alpha + \beta)$ is equal to:

[JEE Main 2026 (Online) 5th April Morning Shift]

- (1) 16 (2) 27 (3) 36 (4) 48

Scan or tap for the full solution



Q.3 Let the line $L_1: x + 3 = 0$ intersect the lines $L_2: x - y = 0$ and $L_3: 3x + y = 0$ at the points A and B, respectively. Let the bisector of the obtuse angle between the lines L_2 and L_3 intersect the line L_1 at the point C. Then $BC^2:AC^2$ is equal to:

[JEE Main 2026 (Online) 4th April Morning Shift]

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

Scan or tap for the full solution



Q.4 Let the vertex A of a triangle ABC be (1, 2), and the mid-point of the side AB be (5, -1). If the centroid of this triangle is (3, 4) and its circumcenter is (α, β) , then $21(\alpha + \beta)$ is equal to :

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) 309 (2) 403 (3) 497 (4) 524

Scan or tap for the full solution



Q.5 Let the mid points of the sides of a triangle ABC be $(\frac{5}{2}, 7)$, $(\frac{5}{2}, 3)$ and (4, 5). If its incentre is (h, k), then $3h + k$ is equal to :

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1) 11 (2) 12 (3) 13 (4) 14

Scan or tap for the full solution



Q.6 Let ABC be an equilateral triangle with orthocenter at the origin and the side BC on the line $x + 2\sqrt{2}y = 4$. If the co-ordinates of the vertex A are (α, β) , then the greatest integer less than or equal to $|\alpha + \sqrt{2}\beta|$ is

[JEE Main 2026 (Online) 28th January Morning Shift]

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

Scan or tap for the full solution



Q.7 Let A(1, 0), B(2, -1) and $C(\frac{7}{3}, \frac{4}{3})$ be three points. If the equation of the bisector of the angle ABC is $\alpha x + \beta y = 5$, then the value of $\alpha^2 + \beta^2$ is

[JEE Main 2026 (Online) 24th January Morning Shift]

- (1) 5 (2) 10 (3) 8 (4) 13

Scan or tap for the full solution



Q.8 Let the angles made with the positive x-axis by two straight lines drawn from the point P(2, 3) and meeting the line $x + y = 6$ at a distance $\sqrt{\frac{2}{3}}$ from the point P be θ_1 and θ_2 . Then the value of $(\theta_1 + \theta_2)$ is:

[JEE Main 2026 (Online) 24th January Evening Shift]

- (1) $\frac{\pi}{2}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{12}$ (4) $\frac{\pi}{6}$

Scan or tap for the full solution



Q.9 A rectangle is formed by the lines $x = 0$, $y = 0$, $x = 3$ and $y = 4$. Let the line L be perpendicular to $3x + y + 6 = 0$ and divide the area of the rectangle into two equal parts. Then the distance of the point $(\frac{1}{2}, -5)$ from the line L is equal to :

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $\sqrt{10}$ (2) $2\sqrt{5}$
 (3) $2\sqrt{10}$ (4) $3\sqrt{10}$

Scan or tap for the full solution



Q.10 Let A(1, 2) and C(-3, -6) be two diagonally opposite vertices of a rhombus, whose sides AD and BC are parallel to the line $7x - y = 14$. If B(α, β) and D(γ, δ) are the other two vertices, then $|\alpha + \beta + \gamma + \delta|$ is equal to :

[JEE Main 2026 (Online) 23rd January Evening Shift]

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

Scan or tap for the full solution

**Q.11** Among the statements(S1) : If $A(5, -1)$ and $B(-2, 3)$ are two vertices of a triangle, whose orthocentre is $(0, 0)$, then its third vertex is $(-4, -7)$

and

(S2) : If positive numbers $2a, b, c$ are three consecutive terms of an A.P., then the lines $ax + by + c = 0$ are concurrent at $(2, -2)$,

[JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) both are incorrect (2) only (S2) is correct
 (3) both are correct (4) only (S1) is correct

Scan or tap for the full solution

**Q.12** Let a point A lie between the parallel lines L_1 and L_2 such that its distances from L_1 and L_2 are 6 and 3 units, respectively. Then the area (in sq. units) of the equilateral triangle ABC, where the points B and C lie on the lines L_1 and L_2 , respectively, is :

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) $21\sqrt{3}$ (2) $12\sqrt{2}$
 (3) $15\sqrt{6}$ (4) 27

Scan or tap for the full solution

**Q.13** Let a be the length of a side of a square OABC with O being the origin. Its side OA makes an acute angle α with the positive x-axis and the equations of its diagonals are $(\sqrt{3} + 1)x + (\sqrt{3} - 1)y = 0$ and $(\sqrt{3} - 1)x - (\sqrt{3} + 1)y + 8\sqrt{3} = 0$. Then a^2 is equal to :

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) 48 (2) 16 (3) 24 (4) 32

Scan or tap for the full solution

**Q.14** A line passing through the point $P(a, 0)$ makes an acute angle α with the positive x-axis. Let this line be rotated about the point P through an angle $\frac{\alpha}{2}$ in the clockwise direction. If in the new position, the slope of the line is $2 - \sqrt{3}$ and its distance from the origin is $\frac{1}{\sqrt{2}}$, then the value of $3a^2 \tan^2 \alpha - 2\sqrt{3}$ is

[JEE Main 2025 (Online) 8th April Evening Shift]

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

Scan or tap for the full solution

**Q.15** Let ABC be the triangle such that the equations of lines AB and AC be $3y - x = 2$ and $x + y = 2$, respectively, and the points B and C lie on x-axis. If P is the orthocentre of the triangle ABC, then the area of the triangle PBC is equal to

[JEE Main 2025 (Online) 7th April Morning Shift]

- (1) 8 (2) 4 (3) 10 (4) 6

Scan or tap for the full solution

**Q.16** If the orthocenter of the triangle formed by the lines $y = x + 1$, $y = 4x - 8$ and $y = mx + c$ is at $(3, -1)$, then $m - c$ is :

[JEE Main 2025 (Online) 7th April Evening Shift]

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

Scan or tap for the full solution

**Q.17** Let the three sides of a triangle lie on the lines $4x - 7y + 10 = 0$, $x + y = 5$ and $7x + 4y = 15$. Then the distance of its orthocentre from the orthocentre of the triangle formed by the lines $x = 0$, $y = 0$ and $x + y = 1$ is

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) $\sqrt{20}$ (2) 20 (3) $\sqrt{5}$ (4) 5

Scan or tap for the full solution

**Q.18** 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

[JEE Main 2025 (Online) 3rd April Morning Shift]

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

Scan or tap for the full solution

**Q.19** Consider the lines $x(3\lambda + 1) + y(7\lambda + 2) = 17\lambda + 5$, λ being a parameter, all passing through a point P. One of these lines (say L) is farthest from the origin. If the distance of L from the point $(3, 6)$ is d, then the value of d^2 is

[JEE Main 2025 (Online) 3rd April Evening Shift]

- (1) 10 (2) 20 (3) 15 (4) 30

Scan or tap for the full solution



- Q.20** Let the area of the triangle formed by a straight line $L: x + by + c = 0$ with co-ordinate axes be 48 square units. If the perpendicular drawn from the origin to the line L makes an angle of 45° with the positive x -axis, then the value of $b^2 + c^2$ is :

[JEE Main 2025 (Online) 2nd April Evening Shift]

- (1) 90 (2) 83 (3) 93 (4) 97

Scan or tap for the full solution



- Q.21** Let ΔABC be a triangle formed by the lines $7x - 6y + 3 = 0$, $x + 2y - 31 = 0$ and $9x - 2y - 19 = 0$. Let the point (h, k) be the image of the centroid of ΔABC in the line $3x + 6y - 53 = 0$. Then $h^2 + k^2 + hk$ is equal to :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) 47 (2) 37 (3) 40 (4) 36

Scan or tap for the full solution



- Q.22** Let the line $x + y = 1$ meet the axes of x and y at A and B , respectively. A right angled triangle AMN is inscribed in the triangle OAB , where O is the origin and the points M and N lie on the lines OB and AB , respectively. If the area of the triangle AMN is $\frac{4}{9}$ of the area of the triangle OAB and $AN:NB = \lambda:1$, then the sum of all possible value(s) of λ is:

[JEE Main 2025 (Online) 29th January Evening Shift]

- (1)
- $\frac{1}{2}$
- (2)
- $\frac{5}{2}$
- (3) 2 (4)
- $\frac{13}{6}$

Scan or tap for the full solution



- Q.23** Two equal sides of an isosceles triangle are along $-x + 2y = 4$ and $x + y = 4$. If m is the slope of its third side, then the sum of all possible distinct values of m is:

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1)
- $-2\sqrt{10}$
- (2) 12
-
- (3) -6 (4) 6

Solution



- Q.24** Let the lines $3x - 4y - \alpha = 0$, $8x - 11y - 33 = 0$, and $2x - 3y + \lambda = 0$ be concurrent. If the image of the point $(1, 2)$ in the line $2x - 3y + \lambda = 0$ is $\left(\frac{57}{13}, \frac{-40}{13}\right)$, then $|\alpha\lambda|$ is equal to

[JEE Main 2025 (Online) 24th January Morning Shift]

- (1) 91 (2) 113 (3) 101 (4) 84

Scan or tap for the full solution



- Q.25** Let the points $\left(\frac{11}{2}, \alpha\right)$ lie on or inside the triangle with sides $x + y = 11$, $x + 2y = 16$ and $2x + 3y = 29$. Then the product of the smallest and the largest values of α is equal to :

[JEE Main 2025 (Online) 24th January Evening Shift]

- (1) 22 (2) 33 (3) 55 (4) 44

Scan or tap for the full solution



- Q.26** Let the area of a ΔPQR with vertices $P(5, 4)$, $Q(-2, 4)$ and $R(a, b)$ be 35 square units. If its orthocenter and centroid are $O\left(2, \frac{14}{5}\right)$ and $C(c, d)$ respectively, then $c + 2d$ is equal to

[JEE Main 2025 (Online) 23rd January Morning Shift]

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

Scan or tap for the full solution



- Q.27** A rod of length eight units moves such that its ends A and B always lie on the lines $x - y + 2 = 0$ and $y + 2 = 0$, respectively. If the locus of the point P , that divides the rod AB internally in the ratio $2:1$ is $9(x^2 + \alpha y^2 + \beta xy + \gamma x + 28y) - 76 = 0$, then $\alpha - \beta - \gamma$ is equal to :

[JEE Main 2025 (Online) 23rd January Evening Shift]

- (1) 24 (2) 22 (3) 21 (4) 23

Scan or tap for the full solution



- Q.28** Let the triangle PQR be the image of the triangle with vertices $(1, 3)$, $(3, 1)$ and $(2, 4)$ in the line $x + 2y = 2$. If the centroid of ΔPQR is the point (α, β) , then $15(\alpha - \beta)$ is equal to :

[JEE Main 2025 (Online) 22nd January Morning Shift]

- (1) 21 (2) 19 (3) 22 (4) 24

Scan or tap for the full solution



- Q.29** A variable line L passes through the point $(3, 5)$ and intersects the positive coordinate axes at the points A and B . The minimum area of the triangle OAB , where O is the origin, is :

[JEE Main 2024 (Online) 9th April Morning Shift]

- (1) 35 (2) 25 (3) 30 (4) 40

Scan or tap for the full solution



- Q.30** A ray of light coming from the point $P(1, 2)$ gets reflected from the point Q on the x -axis and then passes through the point $R(4, 3)$. If the point $S(h, k)$ is such that $PQRS$ is a parallelogram, then hk^2 is equal to:

[JEE Main 2024 (Online) 9th April Morning Shift]

- (1) 60 (2) 70 (3) 80 (4) 90

Scan or tap for the full solution



- Q.31** Two vertices of a triangle ABC are A(3, -1) and B(-2, 3), and its orthocentre is P(1, 1). If the coordinates of the point C are (α , β) and the centre of the circle circumscribing the triangle PAB is (h, k), then the value of $(\alpha + \beta) + 2(h + k)$ equals

[JEE Main 2024 (Online) 9th April Evening Shift]

- (1) 81 (2) 15 (3) 51 (4) 5

Scan or tap for the
full solution



- Q.32** The equations of two sides AB and AC of a triangle ABC are $4x + y = 14$ and $3x - 2y = 5$, respectively.

The point $\left(2, -\frac{4}{3}\right)$ divides the third side BC internally in the ratio 2:1, the equation of the side BC is

[JEE Main 2024 (Online) 8th April Morning Shift]

- (1) $x + 6y + 6 = 0$ (2) $x - 3y - 6 = 0$
(3) $x + 3y + 2 = 0$ (4) $x - 6y - 10 = 0$

Scan or tap for the
full solution



- Q.33** If the line segment joining the points (5, 2) and (2, a) subtends an angle $\frac{\pi}{4}$ at the origin, then the absolute value of the product of all possible values of a is :

[JEE Main 2024 (Online) 8th April Evening Shift]

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

Scan or tap for the
full solution



- Q.34** If the image of the point (-4, 5) in the line $x + 2y = 2$ lies on the circle $(x + 4)^2 + (y - 3)^2 = r^2$, then r is equal to:

[JEE Main 2024 (Online) 8th April Evening Shift]

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

Scan or tap for the
full solution



- Q.35** Let a variable line of slope $m > 0$ passing through the point (4, -9) intersect the coordinate axes at the points A and B. The minimum value of the sum of the distances of A and B from the origin is

[JEE Main 2024 (Online) 6th April Morning Shift]

- (1) 30 (2) 15 (3) 10 (4) 25

Scan or tap for the
full solution



- Q.36** If P(6, 1) be the orthocentre of the triangle whose vertices are A(5, -2), B(8, 3) and C(h, k), then the point C lies on the circle :

[JEE Main 2024 (Online) 6th April Evening Shift]

- (1) $x^2 + y^2 - 74 = 0$ (2) $x^2 + y^2 - 65 = 0$
(3) $x^2 + y^2 - 61 = 0$ (4) $x^2 + y^2 - 52 = 0$

Scan or tap for the
full solution



- Q.37** If the locus of the point, whose distances from the point (2, 1) and (1, 3) are in the ratio 5:4, is $ax^2 + by^2 + cxy + dx + ey + 170 = 0$, then the value of $a^2 + 2b + 3c + 4d + e$ is equal to :

[JEE Main 2024 (Online) 6th April Evening Shift]

- (1) 37 (2) -27 (3) 437 (4) 5

Scan or tap for the
full solution



- Q.38** Let two straight lines drawn from the origin O intersect the line $3x + 4y = 12$ at the points P and Q such that $\triangle OPQ$ is an isosceles triangle and $\angle POQ = 90^\circ$. If $l = OP^2 + PQ^2 + QO^2$, then the greatest integer less than or equal to l is :

[JEE Main 2024 (Online) 5th April Morning Shift]

- (1) 42 (2) 46 (3) 48 (4) 44

Scan or tap for the
full solution



- Q.39** Let A(-1, 1) and B(2, 3) be two points and P be a variable point above the line AB such that the area of $\triangle PAB$ is 10. If the locus of P is $ax + by = 15$, then $5a + 2b$ is :

[JEE Main 2024 (Online) 5th April Evening Shift]

- (1) $-\frac{12}{5}$ (2) $-\frac{6}{5}$ (3) 6 (4) 4

Scan or tap for the
full solution



- Q.40** The vertices of a triangle are A(-1, 3), B(-2, 2) and C(3, -1). A new triangle is formed by shifting the sides of the triangle by one unit inwards. Then the equation of the side of the new triangle nearest to origin is :

[JEE Main 2024 (Online) 4th April Morning Shift]

- (1) $-x + y - (2 - \sqrt{2}) = 0$
(2) $x + y - (2 - \sqrt{2}) = 0$
(3) $x + y + (2 - \sqrt{2}) = 0$
(4) $x - y - (2 + \sqrt{2}) = 0$

Scan or tap for the
full solution



- Q.41** Let $\alpha, \beta, \gamma, \delta \in \mathbb{Z}$ and let A(α , β), B(1,0), C(γ , δ) and D(1,2) be the vertices of a parallelogram ABCD. If $AB = \sqrt{10}$ and the points A and C lie on the line $3y = 2x + 1$, then $2(\alpha + \beta + \gamma + \delta)$ is equal to

[JEE Main 2024 (Online) 31st January Morning Shift]

- (1) 8 (2) 5 (3) 12 (4) 10

Scan or tap for the
full solution



- Q.42** Let a variable line passing through the centre of the circle $x^2 + y^2 - 16x - 4y = 0$, meet the positive co-ordinate axes at the points A and B. Then the minimum value of $OA + OB$, where O is the origin, is equal to

[JEE Main 2024 (Online) 31st January Evening Shift]

- (1) 12 (2) 20 (3) 24 (4) 18

Scan or tap for the full solution



- Q.43** Let A(a, b), B(3, 4) and C(-6, -8) respectively denote the centroid, circumcentre and orthocentre of a triangle. Then, the distance of the point $P(2a + 3, 7b + 5)$ from the line $2x + 3y - 4 = 0$ measured parallel to the line $x - 2y - 1 = 0$ is

[JEE Main 2024 (Online) 31st January Evening Shift]

- (1) $\frac{17\sqrt{5}}{6}$ (2) $\frac{15\sqrt{5}}{7}$
(3) $\frac{17\sqrt{5}}{7}$ (4) $\frac{\sqrt{5}}{17}$

Scan or tap for the full solution



- Q.44** A line passing through the point A(9,0) makes an angle of 30° with the positive direction of x-axis. If this line is rotated about A through an angle of 15° in the clockwise direction, then its equation in the new position is :

[JEE Main 2024 (Online) 30th January Morning Shift]

- (1) $\frac{y}{\sqrt{3}+2} + x = 9$ (2) $\frac{x}{\sqrt{3}+2} + y = 9$
(3) $\frac{x}{\sqrt{3}-2} + y = 9$ (4) $\frac{y}{\sqrt{3}-2} + x = 9$

Scan or tap for the full solution



- Q.45** If $x^2 - y^2 + 2hxy + 2gx + 2fy + c = 0$ is the locus of a point, which moves such that it is always equidistant from the lines $x + 2y + 7 = 0$ and $2x - y + 8 = 0$, then the value of $g + c + h - f$ equals

[JEE Main 2024 (Online) 30th January Evening Shift]

- (1) 8 (2) 14 (3) 29 (4) 6

Scan or tap for the full solution



- Q.46** Let $(5, \frac{a}{4})$ be the circumcenter of a triangle with vertices A(a, -2), B(a, 6) and $C(\frac{a}{4}, -2)$. Let α denote the circumradius, β denote the area and γ denote the perimeter of the triangle. Then $\alpha + \beta + \gamma$ is

[JEE Main 2024 (Online) 29th January Morning Shift]

- (1) 60 (2) 62 (3) 53 (4) 30

Scan or tap for the full solution



- Q.47** In a $\triangle ABC$, suppose $y = x$ is the equation of the bisector of the angle B and the equation of the side AC is $2x - y = 2$. If $2AB = BC$ and the points A and B are respectively (4,6) and (α, β) , then $\alpha + 2\beta$ is equal to

[JEE Main 2024 (Online) 29th January Morning Shift]

- (1) 42 (2) 39 (3) 48 (4) 45

Scan or tap for the full solution



- Q.48** Let A be the point of intersection of the lines $3x + 2y = 14$, $5x - y = 6$ and B be the point of intersection of the lines $4x + 3y = 8$, $6x + y = 5$. The distance of the point P(5, -2) from the line AB is

[JEE Main 2024 (Online) 29th January Evening Shift]

- (1) $\frac{13}{2}$ (2) 8 (3) $\frac{5}{2}$ (4) 6

Scan or tap for the full solution



- Q.49** The distance of the point (2,3) from the line $2x - 3y + 28 = 0$, measured parallel to the line $\sqrt{3}x - y + 1 = 0$, is equal to

[JEE Main 2024 (Online) 29th January Evening Shift]

- (1) $3 + 4\sqrt{2}$ (2) $6\sqrt{3}$
(3) $4 + 6\sqrt{3}$ (4) $4\sqrt{2}$

Scan or tap for the full solution



- Q.50** The portion of the line $4x + 5y = 20$ in the first quadrant is trisected by the lines L_1 and L_2 passing through the origin. The tangent of an angle between the lines L_1 and L_2 is :

[JEE Main 2024 (Online) 27th January Morning Shift]

- (1) $\frac{30}{41}$ (2) $\frac{8}{5}$ (3) $\frac{2}{5}$ (4) $\frac{25}{41}$

Scan or tap for the full solution



- Q.51** Let R be the interior region between the lines $3x - y + 1 = 0$ and $x + 2y - 5 = 0$ containing the origin. The set of all values of a, for which the points $(a^2, a + 1)$ lie in R, is :

[JEE Main 2024 (Online) 27th January Evening Shift]

- (1) $(-3, 0) \cup (\frac{2}{3}, 1)$ (2) $(-3, 0) \cup (\frac{1}{3}, 1)$
(3) $(-3, -1) \cup (\frac{1}{3}, 1)$ (4) $(-3, -1) \cup (-\frac{1}{3}, 1)$

Scan or tap for the full solution



Section B (Numerical) — 12 questions

- Q.52** From the point $(-1, -1)$, two rays are sent making angles of 45° with the line $x + y = 0$. These rays get reflected from the mirror $x + 2y = 1$. If the equations of the reflected rays are $ax + by = 9$ and $cx + dy = 7$, $a, b, c, d \in \mathbb{Z}$, then the value of $ad + bc$ is _____.

[JEE Main 2026 (Online) 5th April Evening Shift]

Scan or tap for the full solution



- Q.53** Let A, B be points on the two half-lines $x - \sqrt{3}|y| = \alpha$, $\alpha > 0$ at a distance of α from their point of intersection P . The line segment AB meets the angle bisector of the given half-lines at the point Q . If $PQ = \frac{9}{2}$ and R is the radius of the circumcircle of $\triangle PAB$, then $\frac{\alpha^2}{R}$ is equal to _____.

[JEE Main 2026 (Online) 4th April Evening Shift]

Scan or tap for the full solution



- Q.54** If P is a point on the circle $x^2 + y^2 = 4$, Q is a point on the straight line $5x + y + 2 = 0$ and $x - y + 1 = 0$ is the perpendicular bisector of PQ , then 13 times the sum of abscissa of all such points P is _____.

[JEE Main 2026 (Online) 21st January Evening Shift]

Scan or tap for the full solution



- Q.55** Let $A(4, -2)$, $B(1, 1)$ and $C(9, -3)$ be the vertices of a triangle ABC . Then the maximum area of the parallelogram $AFDE$, formed with vertices D, E and F on the sides BC, CA and AB of the triangle ABC respectively, is _____.

[JEE Main 2025 (Online) 2nd April Evening Shift]

Scan or tap for the full solution



- Q.56** Let $A(6, 8)$, $B(10\cos\alpha, -10\sin\alpha)$ and $C(-10\sin\alpha, 10\cos\alpha)$, be the vertices of a triangle. If $L(a, 9)$ and $G(h, k)$ be its orthocenter and centroid respectively, then $(5a - 3h + 6k + 100\sin 2\alpha)$ is equal to _____.

[JEE Main 2025 (Online) 22nd January Evening Shift]

Scan or tap for the full solution



- Q.57** Let the distance between two parallel lines be 5 units and a point P lie between the lines at a unit distance from one of them. An equilateral triangle PQR is formed such that Q lies on one of the parallel lines, while R lies on the other. Then $(QR)^2$ is equal to _____.

[JEE Main 2025 (Online) 22nd January Evening Shift]

Scan or tap for the full solution



- Q.58** If the orthocentre of the triangle formed by the lines $2x + 3y - 1 = 0$, $x + 2y - 1 = 0$ and $ax + by - 1 = 0$, is the centroid of another triangle, whose circumcentre and orthocentre respectively are $(3, 4)$ and $(-6, -8)$, then the value of $|a - b|$ is _____.

[JEE Main 2024 (Online) 8th April Morning Shift]

Scan or tap for the full solution



- Q.59** Let a ray of light passing through the point $(3, 10)$ reflects on the line $2x + y = 6$ and the reflected ray passes through the point $(7, 2)$. If the equation of the incident ray is $ax + by + 1 = 0$, then $a^2 + b^2 + 3ab$ is equal to _____.

[JEE Main 2024 (Online) 8th April Evening Shift]

Scan or tap for the full solution



- Q.60** Consider a triangle ABC having the vertices $A(1, 2)$, $B(\alpha, \beta)$ and $C(\gamma, \delta)$ and angles $\angle ABC = \frac{\pi}{6}$ and $\angle BAC = \frac{2\pi}{3}$. If the points B and C lie on the line $y = x + 4$, then $\alpha^2 + \gamma^2$ is equal to _____.

[JEE Main 2024 (Online) 4th April Evening Shift]

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- Q.61** Let ABC be an isosceles triangle in which A is at $(-1, 0)$, $\angle A = \frac{2\pi}{3}$, $AB = AC$ and B is on the positive x -axis. If $BC = 4\sqrt{3}$ and the line BC intersects the line $y = x + 3$ at (α, β) , then $\frac{\beta^4}{\alpha^2}$ is _____.

[JEE Main 2024 (Online) 1st February Evening Shift]

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- Q.62** Let $A(-2, -1)$, $B(1, 0)$, $C(\alpha, \beta)$ and $D(\gamma, \delta)$ be the vertices of a parallelogram $ABCD$. If the point C lies on $2x - y = 5$ and the point D lies on $3x - 2y = 6$, then the value of $|\alpha + \beta + \gamma + \delta|$ is equal to _____.

[JEE Main 2024 (Online) 31st January Evening Shift]

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Q.63 If the sum of squares of all real values of α , for which the lines $2x - y + 3 = 0$, $6x + 3y + 1 = 0$ and $\alpha x + 2y - 2 = 0$ do not form a triangle is p , then the greatest integer less than or equal to p is _____.

[JEE Main 2024 (Online) 27th January Evening Shift]

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ANSWER KEY

Section A (MCQ) — 51 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	4	1	3	3	2	2	1	3	2	3
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	1	1	2	4	1	3	2	2	4	2	3
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	4	1	2	1	4	3	3	2	4	3	1
Ques.	34	35	36	37	38	39	40	41	42	43	44
Ans.	1	4	2	1	2	1	2	1	4	3	4
Ques.	45	46	47	48	49	50	51				
Ans.	2	3	1	4	3	1	2				

Section B (Numerical) — 12 questions

Ques.	52	53	54	55	56	57	58
Ans.	7	9	2	3	145	28	16
Ques.	59	60	61	62	63		
Ans.	1	14	36	32	32		