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MATHEMATICS · JEE MAIN

Straight Lines

Previous Year Questions with answers

230 questions · **161** papers · **2002–2026** · newest paper first

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What is in this PDF: every Straight Lines question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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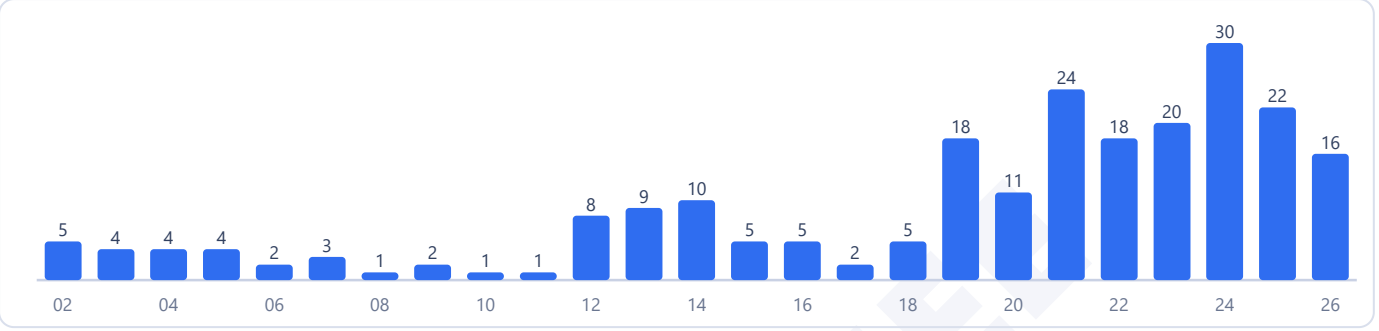
Chapter at a glance

3.5%	230	125 of 162	203 / 27
of Mathematics questions, 2019–2026	questions, 2002–2026	papers asked it, 2019–2026	MCQ / numerical, 2002–2026

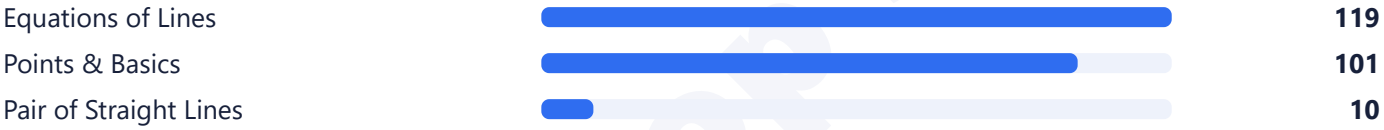
Trend. Rising: 1.2 questions per paper in 2024–2026 against 0.9 in 2019–2023.

Questions per year



Counts are the questions we hold: 230 in 161 papers. 2 questions in this chapter came back in more than one paper.

Most-asked topics in this chapter (2002–2026)



How often it comes up

Straight lines provides the primary algebraic language for two-dimensional coordinate geometry under Unit 10: Coordinate Geometry in the Class 11 curriculum, standing at rank 16 among the 29 chapters in the subject. Across the 162 papers conducted between 2019 and 2026, this chapter contributed 159 questions, capturing 3.5 percent of all mathematics questions. It appeared in 125 of those 162 papers and has been asked every year since 2019. In the recent 2024 to 2026 examination cycle, it supplied 68 questions across 58 papers, averaging 1.2 questions per paper with an increased subject share of 4.4 percent. Comparing the 2002 to 2018 share of 5.4 percent to the 2024 to 2026 share shows that its long-term share is down, whereas comparing 2019 to 2026 against 2024 to 2026 shows it is up. Over the full 2002 to 2026 archive spanning 200 papers, 230 questions appeared in 161 papers, with 27 questions appearing in the numerical answer format from 2019 to 2026.

In the 2024, 2025, and 2026 cycles, the question counts were 30, 22, and 16 questions respectively.

Because lines define the sides of triangles, chords of circles, and axes of symmetry, straight line mechanics permeate all of coordinate geometry. Even when an exam problem is categorized under circles or parabolas, the core algebraic workload frequently reduces to line perpendicularity, distance formulas, or angle bisectors.

Most-asked topics

Questions in this chapter divide between two large primary topics and one historical subtopic:

1. **Equations of Lines (83 questions, 2019-2026; 119 total, last asked 2026)** The largest concentration of questions involves slope forms, intercept forms, parametric or symmetric line equations, distance between parallel lines, perpendicular distance from a point to a line, and equations of angle bisectors.

2. **Points & Basics (73 questions, 2019-2026; 101 total, last asked 2026)** Deals with triangle geometry in coordinates, including the centroid, incentre, circumcentre, and orthocentre. Many questions ask students to find the

image of a point or the foot of a perpendicular across a given line, or determine collinearity and concurrency conditions.

3. **Pair of Straight Lines (3 questions, 2019-2026; 10 total, last asked 2023)** Covers homogeneous and general second-degree equations representing pairs of intersecting or parallel lines, angle bisectors of line pairs, and lines joining the origin to intersection points. This topic was officially removed in recent syllabus revisions.

What the questions look like

Examiners repeatedly deploy several classical coordinate configurations:

- **Triangle Centres and Orthocentre Relations**: Given two vertices of a triangle and its orthocentre or circumcentre, compute the coordinates of the third vertex using perpendicular slope relations and section formulas.
- **Parametric Distance Along a Line**: A line drawn in a specific angular direction from a known point intersects another line or circle. Using the parametric form x equals x1 plus r cos theta allows distances along the ray to be found cleanly.
- **Angle Bisectors and Reflections**: Determining the bisector of the acute or obtuse angle between two intersecting lines, or identifying the image of a given point in a reflecting line mirror.
- **Perpendicular Distance and Parallel Strips**: Finding locus points or triangle areas bounded between parallel lines separated by specified perpendicular offsets.

How to practise it

Fluency in straight lines depends on using coordinate shortcuts rather than raw algebra:

- **Use the parametric symmetric form**: Whenever a problem mentions distance measured along a line inclined at an angle, express coordinates as x1 plus r cos theta and y1 plus r sin theta. Substituting these directly into the target curve or line yields a simple quadratic or linear equation in r.
- **Master the foot of the perpendicular formula**: Memorise the standard coordinate formulas for the foot of the perpendicular and the reflection image of a point across the line ax plus by plus c equals zero. Deriving them from scratch during the exam wastes critical minutes.
- **Exploit Euler's line relationship**: In any non-equilateral triangle, remember that the orthocentre, centroid, and circumcentre are collinear, with the centroid dividing the distance between orthocentre and circumcentre in the ratio two to one. This property frequently shortcuts vertex computations.
- **Differentiate acute and obtuse bisectors**: Write both line equations with positive constant terms. Evaluate the sign of a1 a2 plus b1 b2. If it is positive, the positive sign yields the obtuse angle bisector; if negative, the positive sign corresponds to the acute angle bisector.

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Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

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 :

(A) $x + y - 7 = 0$
(B) $x + y - 14xy = 0$
(C) $2x + y + 14xy = 0$
(D) $x + 2y - 14xy = 0$

Answer: (B) $x + y - 14xy = 0$ · Official NTA final key

Q2 JEE Main 2026 · 5 Apr · Shift 1 MCQ

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:

(A) 16
(B) 27
(C) 36
(D) 48

Answer: (D) 48 · Official NTA final key

Q3 JEE Main 2026 · 5 Apr · Shift 2 Numerical

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 $cx + dy = 7$, $a, b, c, d \in \mathbf{Z}$, then the value of $ad + bc$ is _____.

Numerical value type: the answer is a number.

Answer: 7. · Official NTA final key

Q4 JEE Main 2026 · 4 Apr · Shift 1 MCQ

Let the line $\mathrm{L}_1 : x + 3 = 0$ intersect the lines $\mathrm{L}_2 : x - y = 0$ and $\mathrm{L}_3 : 3x + y = 0$ 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 $\mathrm{BC}^2 : \mathrm{AC}^2$ is equal to:

(A) 5:1
(B) 1:5
(C) 2:3
(D) 3:2

Answer: (A) 5:1 · Official NTA final key

Q5 JEE Main 2026 · 4 Apr · Shift 1 MCQ

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:

(A) 309
(B) 403
(C) 497
(D) 524

Answer: (C) 497 · Official NTA final key

Q6 JEE Main 2026 · 4 Apr · Shift 2 MCQ

Let P $(3\cos\alpha, 2\sin\alpha)$, $\alpha \neq 0$, be a point on the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$, Q be a point on the circle $x^2 + y^2 - 14x - 14y + 82 = 0$ and R be a point on the line $x + y = 5$ such that the centroid of the triangle PQR is $\left(2 + \cos\alpha,\ 3 + \frac{2}{3}\sin\alpha\right)$. Then the sum of the ordinates of all possible points R is:

(A) 6
(B) 2
(C) 4
(D) 8

Answer: (D) 8 · Official NTA final key

Q7 JEE Main 2026 · 4 Apr · Shift 2 Numerical

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 ΔPAB, then $\frac{\alpha^2}{R}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 9. · Official NTA final key

Q8 JEE Main 2026 · 2 Apr · Shift 1 MCQ

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

(A) 11
(B) 12
(C) 13
(D) 14

Answer: (C) 13 · Official NTA final key

Q9 JEE Main 2026 · 28 Jan · Shift 1 MCQ

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

(A) 2
(B) 4
(C) 5
(D) 3

Answer: (B) 4 · Official NTA final key

Q10 JEE Main 2026 · 24 Jan · Shift 1 MCQ

Let A(1, 0), B(2, -1) and C$\left(\frac{7}{3}, \frac{4}{3}\right)$ 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

(A) 10
(B) 8
(C) 13
(D) 5

Answer: (A) 10 · Official NTA final key

Q11 JEE Main 2026 · 24 Jan · Shift 2 MCQ

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:

(A) $\frac{\pi}{6}$
(B) $\frac{\pi}{2}$
(C) $\frac{\pi}{12}$
(D) $\frac{\pi}{3}$

Answer: (B) $\frac{\pi}{2}$ · Official NTA final key

Q12 JEE Main 2026 · 23 Jan · Shift 1 MCQ

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 $\left(\frac{1}{2}, -5\right)$ from the line L is equal to :

(A) $2\sqrt{5}$
(B) $2\sqrt{10}$
(C) $3\sqrt{10}$
(D) $\sqrt{10}$

Answer: (B) $2\sqrt{10}$ · Official NTA final key

Q13 JEE Main 2026 · 23 Jan · Shift 2 MCQ

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

(A) 6
(B) 1
(C) 9
(D) 3

Answer: (A) 6 · Official NTA final key

Q14 JEE Main 2026 · 22 Jan · Shift 2 MCQ

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 $(2, -2)$,

(A) both are correct
(B) only (S2) is correct
(C) both are incorrect
(D) only (S1) is correct

Answer: (A) both are correct · Official NTA final key

Q15 JEE Main 2026 · 21 Jan · Shift 1 MCQ

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 :

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(A) $21\sqrt{3}$
(B) $15\sqrt{6}$
(C) 27
(D) $12\sqrt{2}$

Answer: (A) $21\sqrt{3}$ · Official NTA final key

Q16 JEE Main 2026 · 21 Jan · Shift 2 Numerical

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 _____.

Numerical value type: the answer is a number.

Answer: 2. · Official NTA final key

Q17 JEE Main 2025 · 8 Apr · Shift 2 MCQ

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

(A) 24
(B) 48
(C) 32
(D) 16

Answer: (B) 48 · Checked by our team

Q18 JEE Main 2025 · 8 Apr · Shift 2 MCQ

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 clock-wise 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

(A) 8
(B) 6
(C) 5
(D) 4

Answer: (D) 4 · Key from source paper

Q19 JEE Main 2025 · 7 Apr · Shift 1 MCQ

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

(A) 8
(B) 4
(C) 10
(D) 6

Answer: (D) 6 · Key from source paper

Q20 JEE Main 2025 · 7 Apr · Shift 2 MCQ

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 :

(A) -1
(B) 4
(C) 0
(D) 2

Answer: (C) 0 · Key from source paper

Q21 JEE Main 2025 · 4 Apr · Shift 1 MCQ

Let the three sides of a triangle are 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 tringle formed by the lines $x = 0, y = 0$ and $x + y = 1$ is

(A) $\sqrt{5}$
(B) 5
(C) $\sqrt{20}$
(D) 20

Answer: (A) $\sqrt{5}$ · Key from source paper

Q22 JEE Main 2025 · 3 Apr · Shift 1 MCQ

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

(A) 5
(B) 4
(C) 2
(D) 3

Answer: (D) 3 · Key from source paper

Q23 JEE Main 2025 · 3 Apr · Shift 2 MCQ

Consider the lines $x(3\lambda+1)+y(7\lambda+2)=17\lambda+5, \lambda$ 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

(A) 30
(B) 15
(C) 20
(D) 10

Answer: (C) 20 · Key from source paper

Q24 JEE Main 2025 · 2 Apr · Shift 2 MCQ

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 :

(A) 90
(B) 83
(C) 97
(D) 93

Answer: (C) 97 · Key from source paper

Q25 JEE Main 2025 · 2 Apr · Shift 2 Numerical

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 _____

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q26 JEE Main 2025 · 29 Jan · Shift 1 MCQ

Let ABC 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 $\triangle ABC$ in the line $3x+6y-53=0$. Then h^2+k^2+hk is equal to:

(A) 47
(B) 37
(C) 36
(D) 40

Answer: (B) 37 · Key from source paper

Q27 JEE Main 2025 · 29 Jan · Shift 2 MCQ

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 = λ : 1, then the sum of all possible value(s) of λ is :

(A) 2
(B) $\frac{5}{2}$
(C) $\frac{1}{2}$
(D) $\frac{13}{6}$

Answer: (A) 2 · Key from source paper

Q28 JEE Main 2025 · 28 Jan · Shift 1 MCQ

Let ${}^{n}\mathrm{C}_{r-1} = 28$, ${}^{n}\mathrm{C}_{r} = 56$ and ${}^{n}\mathrm{C}_{r+1} = 70$. Let $\mathrm{A}(4\cos t, 4\sin t)$, $\mathrm{B}(2\sin t, -2\cos t)$ and $C\left(3r - n, r^2 - n - 1\right)$ be the vertices of a triangle ABC, where t is a parameter. If $(3x - 1)^2 + (3y)^2 = \alpha$, is the locus of the centroid of triangle ABC , then α equals

(A) 6
(B) 18
(C) 8
(D) 20

Answer: (D) 20 · Key from source paper

Q29 JEE Main 2025 · 28 Jan · Shift 2 MCQ

Let A, B, C be three points in xy-plane, whose position vector are given by $\sqrt{3}\hat{i} + \hat{j}$, $\hat{i} + \sqrt{3}\hat{j}$ and $\mathrm{a}\hat{i} + (1 - \mathrm{a})\hat{j}$ respectively with respect to the origin O . If the distance of the point C from the line bisecting the angle between the vectors $\overrightarrow{OA}$ and $\overrightarrow{OB}$ is $\frac{9}{\sqrt{2}}$, then the sum of all the possible values of a is :

(A) 2
(B) 9/2
(C) 1
(D) 0

Answer: (C) 1 · Key from source paper

Q30 JEE Main 2025 · 28 Jan · Shift 2 MCQ

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 :

(A) $-2\sqrt{10}$
(B) 12
(C) 6
(D) -6

Answer: (C) 6 · Key from source paper

Q31 JEE Main 2025 · 24 Jan · Shift 1 MCQ

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

(A) 84
(B) 113
(C) 91
(D) 101

Answer: (C) 91 · Key from source paper

Q32 JEE Main 2025 · 24 Jan · Shift 2 MCQ

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 :

(A) 44
(B) 22
(C) 33
(D) 55

Answer: (C) 33 · Key from source paper

Q33 JEE Main 2025 · 23 Jan · Shift 1 MCQ

If the line $3x-2y+12=0$ intersects the parabola $4y=3x^2$ at the points A and B, then at the vertex of the parabola, the line segment AB subtends an angle equal to

(A) $\tan^{-1}\left(\frac{4}{5}\right)$
(B) $\tan^{-1}\left(\frac{9}{7}\right)$
(C) $\tan^{-1}\left(\frac{11}{9}\right)$
(D) $\frac{\pi}{2}-\tan^{-1}\left(\frac{3}{2}\right)$

Answer: (B) $\tan^{-1}\left(\frac{9}{7}\right)$ · Key from source paper

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Q34 JEE Main 2025 · 23 Jan · Shift 1 MCQ

Let the area of a $\triangle PQR$ 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

(A) $\frac{8}{3}$
(B) $\frac{7}{3}$
(C) 2
(D) 3

Answer: (D) 3 · Key from source paper

Q35 JEE Main 2025 · 23 Jan · Shift 2 MCQ

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 $9\left(x^2 + \alpha y^2 + \beta xy + \gamma x + 28y\right) - 76 = 0$, then $\alpha - \beta - \gamma$ is equal to :

(A) 22
(B) 21
(C) 23
(D) 24

Answer: (C) 23 · Key from source paper

Q36 JEE Main 2025 · 22 Jan · Shift 1 MCQ

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 $\triangle PQR$ is the point (α, β), then $15(\alpha - \beta)$ is equal to :

(A) 19
(B) 24
(C) 21
(D) 22

Answer: (D) 22 · Key from source paper

Q37 JEE Main 2025 · 22 Jan · Shift 2 Numerical

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 _____ .

Numerical value type: the answer is a number.

Answer: 145. · Key from source paper

Q38 JEE Main 2025 · 22 Jan · Shift 2 Numerical

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 _____ .

Numerical value type: the answer is a number.

Answer: 28. · Key from source paper

Q39 JEE Main 2024 · 9 Apr · Shift 1 MCQ

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 :

(A) 70
(B) 80
(C) 60
(D) 90

Answer: (A) 70 · Key from source paper

Q40 JEE Main 2024 · 9 Apr · Shift 1 MCQ

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 :

(A) 30
(B) 25
(C) 40
(D) 35

Answer: (A) 30 · Key from source paper

Q41 JEE Main 2024 · 9 Apr · Shift 2 MCQ

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

(A) 5
(B) 81
(C) 15
(D) 51

Answer: (A) 5 · Key from source paper

Q42 JEE Main 2024 · 8 Apr · Shift 1 MCQ

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

(A) $x + 3y + 2 = 0$
(B) $x - 6y - 10 = 0$
(C) $x - 3y - 6 = 0$
(D) $x + 6y + 6 = 0$

Answer: (A) $x + 3y + 2 = 0$ · Key from source paper

Q43 JEE Main 2024 · 8 Apr · Shift 1 Numerical

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 _____

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q44 JEE Main 2024 · 8 Apr · Shift 2 MCQ

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:

(A) 2
(B) 3
(C) 1
(D) 4

Answer: (A) 2 · Key from source paper

Q45 JEE Main 2024 · 8 Apr · Shift 2 MCQ

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 :

(A) 6
(B) 8
(C) 2
(D) -4

Answer: (D) -4 · Key from source paper

Q46 JEE Main 2024 · 8 Apr · Shift 2 Numerical

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 _____

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Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q47 JEE Main 2024 · 6 Apr · Shift 1 MCQ

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

(A) 30
(B) 25
(C) 15
(D) 10

Answer: (B) 25 · Key from source paper

Q48 JEE Main 2024 · 6 Apr · Shift 1 Numerical

Let L_1, L_2 be the lines passing through the point $P(0, 1)$ and touching the parabola $9x^2 + 12x + 18y - 14 = 0$. Let Q and R be the points on the lines L_1 and L_2 such that $\triangle PQR$ is an isosceles triangle with base QR. If the slopes of the lines QR are m_1 and m_2, then $16\,(m_1^2 + m_2^2)$ is equal to

_____

Numerical value type: the answer is a number.

Answer: 68. · Key from source paper

Q49 JEE Main 2024 · 6 Apr · Shift 2 MCQ

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:

(A) $x^2 + y^2 - 61 = 0$
(B) $x^2 + y^2 - 52 = 0$
(C) $x^2 + y^2 - 65 = 0$
(D) $x^2 + y^2 - 74 = 0$

Answer: (C) $x^2 + y^2 - 65 = 0$ · Key from source paper

Q50 JEE Main 2024 · 6 Apr · Shift 2 MCQ

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 :

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(A) 37
(B) 437
(C) -27
(D) 5

Answer: (A) 37 · Key from source paper

Q51 JEE Main 2024 · 5 Apr · Shift 1 MCQ

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 :

(A) 42
(B) 46
(C) 44
(D) 48

Answer: (B) 46 · Key from source paper

Q52 JEE Main 2024 · 5 Apr · Shift 2 MCQ

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 $5a + 2$ b is :

(A) 6
(B) $-\frac{6}{5}$
(C) 4
(D) $-\frac{12}{5}$

Answer: (D) $-\frac{12}{5}$ · Key from source paper

Q53 JEE Main 2024 · 4 Apr · Shift 1 MCQ

The vertices of a triangle are $\mathrm{A}(-1, 3), \mathrm{B}(-2, 2)$ and $\mathrm{C}(3, -1)$. 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 :

(A) $x + y + (2 - \sqrt{2}) = 0$
(B) $-x + y - (2 - \sqrt{2}) = 0$
(C) $x + y - (2 - \sqrt{2}) = 0$
(D) $x - y - (2 + \sqrt{2}) = 0$

Answer: (C) $x + y - (2 - \sqrt{2}) = 0$ · Key from source paper

Q54 JEE Main 2024 · 4 Apr · Shift 2 Numerical

Consider a triangle ABC having the vertices $\mathrm{A}(1,2), \mathrm{B}(\alpha,\beta)$ and $\mathrm{C}(\gamma,\delta)$ 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 _____

Numerical value type: the answer is a number.

Answer: 14. · Key from source paper

Q55 JEE Main 2024 · 1 Feb · Shift 2 Numerical

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:

Numerical value type: the answer is a number.

Answer: 36. · Key from source paper

Q56 JEE Main 2024 · 31 Jan · Shift 1 MCQ

Let $\alpha,\ \beta,\ \gamma,\ \delta \in Z$ and let $A(\alpha,\beta)$, $B(1,0)$, $C(\gamma,\delta)$ 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

(A) 10
(B) 5
(C) 12
(D) 8

Answer: (D) 8 · Key from source paper

Q57 JEE Main 2024 · 31 Jan · Shift 2 MCQ

Let $A(a,b)$, $B(3,4)$ and $(-6,-8)$ 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

(A) $\frac{15\sqrt{5}}{7}$
(B) $\frac{17\sqrt{5}}{6}$
(C) $\frac{17\sqrt{5}}{7}$
(D) $\frac{\sqrt{5}}{17}$

Answer: (C) $\frac{17\sqrt{5}}{7}$ · Key from source paper

Q58 JEE Main 2024 · 31 Jan · Shift 2 MCQ

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 point A and B. Then the minimum value of $OA + OB$, where O is the origin, is equal to

(A) 12
(B) 18
(C) 20
(D) 24

Answer: (B) 18 · Key from source paper

Q59 JEE Main 2024 · 31 Jan · Shift 2 Numerical

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 _____.

Numerical value type: the answer is a number.

Answer: -32. · Checked by our team

Q60 JEE Main 2024 · 30 Jan · Shift 1 MCQ

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

(A) $\frac{y}{\sqrt{3}-2}+x=9$
(B) $\frac{x}{\sqrt{3}-2}+y=9$
(C) $\frac{x}{\sqrt{3}+2}+y=9$
(D) $\frac{y}{\sqrt{3}+2}+x=9$

Answer: (A) $\frac{y}{\sqrt{3}-2}+x=9$ · Key from source paper

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Q61 JEE Main 2024 · 30 Jan · Shift 2 MCQ

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

(A) 14
(B) 6
(C) 8
(D) 29

Answer: (A) 14 · Key from source paper

Q62 JEE Main 2024 · 29 Jan · Shift 1 MCQ

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

(A) 60
(B) 53
(C) 62
(D) 30

Answer: (B) 53 · Key from source paper

Q63 JEE Main 2024 · 29 Jan · Shift 1 MCQ

In a Δ 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 $2\,AB = BC$ and the point A and B are respectively $(4, 6)$ and (α, β), then $\alpha + 2\beta$ is equal to

(A) -4
(B) 42
(C) 2
(D) -1

Answer: (B) 42 · Key from source paper

Q64 JEE Main 2024 · 29 Jan · Shift 2 MCQ

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

(A) $\frac{13}{2}$
(B) 8
(C) $\frac{5}{2}$
(D) 6

Answer: (D) 6 · Key from source paper

Q65 JEE Main 2024 · 29 Jan · Shift 2 MCQ

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

(A) $4\sqrt{2}$
(B) $6\sqrt{3}$
(C) $3 + 4\sqrt{2}$
(D) $4 + 6\sqrt{3}$

Answer: (D) $4 + 6\sqrt{3}$ · Key from source paper

Q66 JEE Main 2024 · 27 Jan · Shift 1 MCQ

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 :

(A) $\frac{8}{5}$
(B) $\frac{25}{41}$
(C) $\frac{2}{5}$
(D) $\frac{30}{41}$

Answer: (D) $\frac{30}{41}$ · Key from source paper

Q67 JEE Main 2024 · 27 Jan · Shift 2 MCQ

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 :

(A) $(-3, -1) \cup -\frac{1}{3}, 1$
(B) $(-3, 0) \cup \frac{1}{3}, 1$
(C) $(-3, 0) \cup \frac{2}{3}, 1$
(D) $(-3, -1) \cup \frac{1}{3}, 1$

Answer: (B) $(-3, 0) \cup \frac{1}{3}, 1$ · Key from source paper

Q68 JEE Main 2024 · 27 Jan · Shift 2 Numerical

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 _____.

Numerical value type: the answer is a number.

Answer: 32. · Key from source paper

Q69 JEE Main 2023 · 15 Apr · Shift 1 MCQ

If (α, β) is the orthocenter of the triangle ABC with vertices $A(3, -7)$, $B(-1, 2)$ and $C(4, 5)$, then $9\alpha - 6\beta + 60$ is equal to

(A) 25
(B) 35
(C) 30
(D) 40

Answer: (A) 25 · Key from source paper

Q70 JEE Main 2023 · 13 Apr · Shift 2 MCQ

Let (α, β) be the centroid of the triangle formed by the lines $15x - y = 82$, $6x - 5y = -4$ and $9x + 4y = 17$. Then $\alpha + 2\beta$ and $2\alpha - \beta$ are the roots of the equation

(A) $x^2 - 7x + 12 = 0$
(B) $x^2 - 14x + 48 = 0$
(C) $x^2 - 13x + 42 = 0$
(D) $x^2 - 10x + 25 = 0$

Answer: (C) $x^2 - 13x + 42 = 0$ · Key from source paper

Q71 JEE Main 2023 · 12 Apr · Shift 1 MCQ

If the point $\left(\alpha, \frac{7\sqrt{3}}{3}\right)$ lies on the curve traced by the mid-points of the line segments of the lines $x\cos\theta + y\sin\theta = 7, \theta \in \left(0, \frac{\pi}{2}\right)$ between the co-ordinates axes, then α is equal to

(A) -7
(B) $-7\sqrt{3}$
(C) $7\sqrt{3}$
(D) 7

Answer: (D) 7 · Key from source paper

Q72 JEE Main 2023 · 11 Apr · Shift 1 MCQ

Let R be a rectangle given by the lines $x = 0$, $x = 2$, $y = 0$ and $y = 5$. Let $A\alpha, 0$ and $B0, \beta$, $\alpha \in 0, 2$ and $\beta \in 0, 5$, be such that the line segment AB divides the area of the rectangle R in the ratio $4 : 1$. Then, the mid-point of AB lies on a

(A) straight line
(B) parabola
(C) hyperbola
(D) circle

Answer: (C) hyperbola · Key from source paper

Q73 JEE Main 2023 · 11 Apr · Shift 2 Numerical

If the line $l_1 : 3y - 2x = 3$ is the angular bisector of the lines $l_2 : x - y + 1 = 0$ and $l_3 : \alpha x + \beta y + 17 = 0$, then $\alpha^2 + \beta^2 - \alpha - \beta$ is equal to _____

Numerical value type: the answer is a number.

Answer: 348. · Key from source paper

Q74 JEE Main 2023 · 10 Apr · Shift 2 MCQ

Let A be the point $1, 2$ and B be any point on the curve $x^2 + y^2 = 16$. If the centre of the locus of the point P, which divides the line segment AB in the ratio $3 : 2$ is the point $C\alpha, \beta$, then the length of the line segment AC is

(A) $\frac{3\sqrt{5}}{5}$
(B) $\frac{4\sqrt{5}}{5}$
(C) $\frac{2\sqrt{5}}{5}$
(D) $\frac{6\sqrt{5}}{5}$

Answer: (A) $\frac{3\sqrt{5}}{5}$ · Key from source paper

Q75 JEE Main 2023 · 10 Apr · Shift 2 Numerical

Let the equations of two adjacent sides of a parallelogram $ABCD$ be $2x - 3y = -23$ and $5x + 4y = 23$. If equation of its one diagonal AC is $3x + 7y = 23$ and the distance of A from the other diagonal is d, then $50d^2$ is equal to _____

Numerical value type: the answer is a number.

Answer: 529. · Key from source paper

Q76 JEE Main 2023 · 8 Apr · Shift 1 MCQ

Let $C(\alpha, \beta)$ be the circumcentre of the triangle formed by the lines $4x + 3y = 69$, $4y - 3x = 17$, and $x + 7y = 61$. Then $(\alpha - \beta)^2 + \alpha + \beta$ is equal to

(A) 18
(B) 17
(C) 15
(D) 16

Answer: (B) 17 · Key from source paper

Q77 JEE Main 2023 · 8 Apr · Shift 2 MCQ

Let $A(0, 1)$, $B(1, 1)$ and $C(1, 0)$ be the mid-points of the sides of a triangle with incentre at the point D. If the focus of the parabola $y^2 = 4ax$ passing through D is $(\alpha + \beta\sqrt{2}, 0)$, where α and β are rational numbers, then $\frac{\alpha}{\beta^2}$ is equal to

(A) 8
(B) 12
(C) 6
(D) $\frac{9}{2}$

Answer: (A) 8 · Key from source paper

Q78 JEE Main 2023 · 6 Apr · Shift 1 MCQ

The straight lines l_1 and l_2 pass through the origin and trisect the line segment of the line $L : 9x + 5y = 45$ between the axes. If m_1 and m_2 are the slopes of the lines l_1 and l_2, then the point of intersection of the line $y = (m_1 + m_2)x$ with L lies on

(A) $y - 2x = 5$
(B) $6x + y = 10$
(C) $y - x = 5$
(D) $6x - y = 15$

Answer: (C) $y - x = 5$ · Key from source paper

Q79 JEE Main 2023 · 1 Feb · Shift 1 MCQ

The combined equation of the two lines $ax + by + c = 0$ and $a'x + b'y + c' = 0$ can be written as $ax + by + ca'x + b'y + c' = 0$. The equation of the angle bisectors of the lines represented by the equation $2x^2 + xy - 3y^2 = 0$ is

(A) $3x^2 + 5xy + 2y^2 = 0$
(B) $x^2 - y^2 + 10xy = 0$
(C) $3x^2 + xy - 2y^2 = 0$
(D) $x^2 - y^2 - 10xy = 0$

Answer: (D) $x^2 - y^2 - 10xy = 0$ · Key from source paper

Q80 JEE Main 2023 · 1 Feb · Shift 1 MCQ

If the orthocentre of the triangle, whose vertices are 1, 2, 2, 3 and 3, 1 is α, β, then the quadratic equation whose roots are $\alpha + 4\beta$ and $4\alpha + \beta$, is

(A) $x^2 - 19x + 90 = 0$
(B) $x^2 - 18x + 80 = 0$
(C) $x^2 - 22x + 120 = 0$
(D) $x^2 - 20x + 99 = 0$

Answer: (D) $x^2 - 20x + 99 = 0$ · Key from source paper

Q81 JEE Main 2023 · 30 Jan · Shift 1 MCQ

A straight line cuts off the intercepts $\mathrm{OA} = \mathrm{a}$ and $\mathrm{OB} = \mathrm{b}$ on the positive directions of x-axis and y-axis respectively. If the perpendicular from origin O to this line makes an angle of $\frac{\pi}{6}$ with positive direction of y-axis and the area of $\triangle\mathrm{OAB}$ is $\frac{98}{3}\sqrt{3}$, then $\mathrm{a}^2 - \mathrm{b}^2$ is equal to:

(A) $\frac{392}{3}$
(B) 196
(C) $\frac{196}{3}$
(D) 98

Answer: (A) $\frac{392}{3}$ · Key from source paper

Q82 JEE Main 2023 · 29 Jan · Shift 1 MCQ

A light ray emits from the origin making an angle 30° with the positive x-axis. After getting reflected by the line $\mathrm{x}+\mathrm{y}=1$, if this ray intersects x-axis at Q, then the abscissa of Q is

(A) $\frac{2}{(\sqrt{3}-1)}$
(B) $\frac{2}{3+\sqrt{3}}$
(C) $\frac{2}{3-\sqrt{3}}$
(D) $\frac{\sqrt{3}}{2(\sqrt{3}+1)}$

Answer: (B) $\frac{2}{3+\sqrt{3}}$ · Key from source paper

Q83 JEE Main 2023 · 29 Jan · Shift 1 MCQ

Let B and C be the two points on the line $y+x=0$ such that B and C are symmetric with respect to the origin. Suppose A is a point on $\mathrm{y}-2\mathrm{x}=2$ such that $\triangle ABC$ is an equilateral triangle. Then, the area of the $\triangle ABC$ is

(A) $3\sqrt{3}$
(B) $2\sqrt{3}$
(C) $\frac{8}{\sqrt{3}}$
(D) $\frac{10}{\sqrt{3}}$

Answer: (C) $\frac{8}{\sqrt{3}}$ · Key from source paper

Q84 JEE Main 2023 · 29 Jan · Shift 2 Numerical

A triangle is formed by the tangents at the point $(2,2)$ on the curves $y^2=2x$ and $x^2+y^2=4x$, and the line $x+y+2=0$. If r is the radius of its circumcircle, then r^2 is equal to

Numerical value type: the answer is a number.

Answer: 10. · Key from source paper

Q85 JEE Main 2023 · 25 Jan · Shift 2 Numerical

A triangle is formed by X-axis, Y-axis and the line $3x+4y=60$. Then the number of points $P(a,b)$ which lie strictly inside the triangle, where a is an integer and b is a multiple of a, is _____ .

Numerical value type: the answer is a number.

Answer: 31. · Key from source paper

Q86 JEE Main 2023 · 24 Jan · Shift 1 MCQ

Let PQR be a triangle. The points A, B and C are on the sides QR, RP and PQ respectively such that $\frac{QA}{AR}=\frac{RB}{BP}=\frac{PC}{CQ}=\frac{1}{2}$. Then $\frac{\text{Area }\Delta PQR}{\text{Area }\Delta ABC}$ is equal to

(A) 4
(B) 3
(C) 2
(D) $\frac{5}{2}$

Answer: (B) 3 · Key from source paper

Q87 JEE Main 2023 · 24 Jan · Shift 2 Numerical

The equations of the sides AB, BC & CA of a triangle ABC are $2x + y = 0$, $x + py = 21a$ $(a \neq 0)$ and $x - y = 3$ respectively. Let $P(2, a)$ be the centroid of the triangle ABC, then $(BC)^2$ is equal to

Numerical value type: the answer is a number.

Answer: 122. · Key from source paper

Q88 JEE Main 2023 · 24 Jan · Shift 2 MCQ

The equations of sides AB and AC of a triangle ABC are $(\lambda + 1)x + \lambda y = 4$ and $\lambda x + (1 - \lambda)y + \lambda = 0$ respectively. Its vertex A is on the y-axis and its orthocentre is $(1, 2)$. The length of the tangent from the point C to the part of the parabola $y^2 = 6x$ in the first quadrant is

(A) $\sqrt{6}$
(B) $2\sqrt{2}$
(C) 2
(D) 4

Answer: (B) $2\sqrt{2}$ · Key from source paper

Q89 JEE Main 2022 · 29 Jul · Shift 1 MCQ

Let the circumcentre of a triangle with vertices $A(a, 3)$, $B(b, 5)$ and $C(a, b)$, $ab > 0$ be $P(1, 1)$. If the line AP intersects the line BC at the point $Q(k_1, k_2)$, then $k_1 + k_2$ is equal to

(A) 2
(B) $\frac{4}{7}$
(C) $\frac{2}{7}$
(D) 4

Answer: (B) $\frac{4}{7}$ · Key from source paper

Q90 JEE Main 2022 · 29 Jul · Shift 1 MCQ

Let a line L pass through the point of intersection of the lines $bx + 10y - 8 = 0$ and $2x - 3y = 0$, $b \in R - \left\{\frac{4}{3}\right\}$. If the line L also passes through the point $(1, 1)$ and touches the circle $17(x^2 + y^2) = 16$, then the eccentricity of the ellipse $\frac{x^2}{5} + \frac{y^2}{b^2} = 1$ is

(A) $\frac{2}{\sqrt{5}}$
(B) $\sqrt{\frac{3}{5}}$
(C) $\frac{1}{\sqrt{5}}$
(D) $\sqrt{\frac{2}{5}}$

Answer: (B) $\sqrt{\frac{3}{5}}$ · Key from source paper

Q91 JEE Main 2022 · 29 Jul · Shift 2 MCQ

Let m_1, m_2 be the slopes of two adjacent sides of a square of side a such that $a^2 + 11a + 3(m_1^2 + m_2^2) = 220$. If one vertex of the square is $(10(\cos\alpha - \sin\alpha), 10(\sin\alpha + \cos\alpha))$, where $\alpha \in \left(0, \frac{\pi}{2}\right)$ and the equation of one diagonal is $(\cos\alpha - \sin\alpha)x + (\sin\alpha + \cos\alpha)y = 10$, then $72(\sin^4\alpha + \cos^4\alpha) + a^2 - 3a + 13$ is equal to

(A) 119
(B) 128
(C) 145
(D) 155

Answer: (B) 128 · Key from source paper

Q92 JEE Main 2022 · 29 Jul · Shift 2 MCQ

Let $A\alpha, -2, B\alpha, 6$ and $C\frac{\alpha}{4}, -2$ be vertices of a ΔABC. If $5, \frac{\alpha}{4}$ is the circumcentre of ΔABC, then which of the following is NOT correct about ΔABC

(A) ares is 24
(B) perimeter is 25
(C) circumradius is 5
(D) inradius is 2

Answer: (B) perimeter is 25 · Key from source paper

Q93 JEE Main 2022 · 28 Jul · Shift 1 MCQ

For $t \in 0, 2\pi$, if ABC is an equilateral triangle with vertices $A(\sin t, -\cos t)$, $B(\cos t, \sin t)$ and $C(a, b)$ such that its orthocentre lies on a circle with centre $\left(1, \frac{1}{3}\right)$, then $a^2 - b^2$ is equal to

(A) $\frac{8}{3}$
(B) 8
(C) $\frac{77}{9}$
(D) $\frac{80}{9}$

Answer: (B) 8 · Key from source paper

Q94 JEE Main 2022 · 27 Jul · Shift 1 MCQ

Let $A(1,1)$, $B(-4,3)$, $C(-2,-5)$ be vertices of a triangle ABC, P be a point on side BC, and Δ_1 and Δ_2 be the areas of triangle APB and ABC. Respectively.
If $\Delta_1 : \Delta_2 = 4 : 7$, then the area enclosed by the lines AP, AC and the x-axis is

(A) $\frac{1}{4}$
(B) $\frac{3}{4}$
(C) $\frac{1}{2}$
(D) 1

Answer: (C) $\frac{1}{2}$ · Key from source paper

Q95 JEE Main 2022 · 27 Jul · Shift 2 MCQ

The equations of the sides AB, BC and CA of a triangle ABC are $2x + y = 0$, $x + py = 39$ and $x - y = 3$ respectively and $P(2,3)$ is its circumcentre. Then which of the following is NOT true

(A) $(AC)^2 = 9p$
(B) $(AC)^2 + p^2 = 136$
(C) $32 < \text{area}\,(\Delta ABC) < 36$
(D) $34 < \text{area}\,(\Delta ABC) < 38$

Answer: (D) $34 < \text{area}\,(\Delta ABC) < 38$ · Key from source paper

Q96 JEE Main 2022 · 26 Jul · Shift 1 Numerical

The equations of the sides AB, BC and CA of a triangle ABC are $2x + y = 0$, $x + py = 15a$ and $x - y = 3$ respectively. If its orthocentre is $(2,a)$, $-\frac{1}{2} < a < 2$, then p is equal to

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q97 JEE Main 2022 · 25 Jul · Shift 1 MCQ

A line, with the slope greater than one, passes through the point $A4,3$ and intersects the line $x - y - 2 = 0$ at the point B. If the length of the line segment AB is $\frac{\sqrt{29}}{3}$, then B also lies on the line

(A) $2x + y = 9$
(B) $3x - 2y = 7$
(C) $x + 2y = 6$
(D) $2x - 3y = 3$

Answer: (C) $x + 2y = 6$ · Key from source paper

Q98 JEE Main 2022 · 25 Jul · Shift 2 MCQ

Let the point $P(\alpha, \beta)$ be at a unit distance from each of the two lines $L_1 : 3x - 4y + 12 = 0$, and $L_2 : 8x + 6y + 11 = 0$. If P lies below L_1 and above L_2, then $100(\alpha + \beta)$ is equal to

(A) -14
(B) 42
(C) -22
(D) 14

Answer: (D) 14 · Key from source paper

Q99 JEE Main 2022 · 29 Jun · Shift 1 MCQ

The distance between the two points A and A' which lie on $y = 2$ such that both the line segments AB and $A'B$ (where B is the point $(2, 3)$) subtend angle $\frac{\pi}{4}$ at the origin, is equal to

(A) 10
(B) $\frac{48}{5}$
(C) $\frac{52}{5}$
(D) 3

Answer: (C) $\frac{52}{5}$ · Key from source paper

Q100 JEE Main 2022 · 29 Jun · Shift 2 MCQ

The distance of the origin from the centroid of the triangle whose two sides have the equations $x - 2y + 1 = 0$ and $2x - y - 1 = 0$ and whose orthocenter is $\left(\frac{7}{3}, \frac{7}{3}\right)$ is:

(A) $\sqrt{2}$
(B) 2
(C) $2\sqrt{2}$
(D) 4

Answer: (C) $2\sqrt{2}$ · Key from source paper

Q101 JEE Main 2022 · 28 Jun · Shift 1 Numerical

A ray of light passing through the point $P(2, 3)$ reflects on the X-axis at point A and the reflected ray passes through the point $Q(5, 4)$. Let R be the point that divides the line segment AQ internally into the ratio $2 : 1$. Let the co-ordinates of the foot of the perpendicular M from R on the bisector of the angle PAQ be (α, β). Then, the value of $7\alpha + 3\beta$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 31. · Key from source paper

Q102 JEE Main 2022 · 28 Jun · Shift 2 MCQ

Let a triangle be bounded by the lines $L_1 : 2x + 5y = 10;\ L_2 : -4x + 3y = 12$ and the line L_3, which passes through the point $P(2, 3)$, intersect L_2 at A and L_1 at B. If the point P divides the line-segment AB, internally in the ratio $1 : 3$, then the area of the triangle is equal to

(A) $\frac{110}{13}$
(B) $\frac{132}{13}$
(C) $\frac{142}{13}$
(D) $\frac{151}{13}$

Answer: (B) $\frac{132}{13}$ · Key from source paper

Q103 JEE Main 2022 · 27 Jun · Shift 1 MCQ

In an isosceles triangle ABC, the vertex A is $(6, 1)$ and the equation of the base BC is $2x + y = 4$. Let point B lie on the line $x + 3y = 7$. If (α, β) is the centroid $\triangle ABC$, then $15(\alpha + \beta)$ is equal to

(A) 51
(B) 39
(C) 41
(D) 49

Answer: (A) 51 · Key from source paper

Q104 JEE Main 2022 · 26 Jun · Shift 1 MCQ

Let R be the point $(3, 7)$ and let P and Q be two points on the line $x + y = 5$ such that PQR is an equilateral triangle. Then the area of ΔPQR is

(A) $\frac{25}{4\sqrt{3}}$
(B) $\frac{25\sqrt{3}}{2}$
(C) $\frac{25}{\sqrt{3}}$
(D) $\frac{25}{2\sqrt{3}}$

Answer: (D) $\frac{25}{2\sqrt{3}}$ · Key from source paper

Q105 JEE Main 2022 · 24 Jun · Shift 1 Numerical

Let $A\left(\frac{3}{\sqrt{a}}, \sqrt{a}\right)$, $a > 0$, be a fixed point in the xy-plane. The image of A in y-axis be B and the image of B in x-axis be C. If $D(3\cos\theta, a\sin\theta)$, is a point in the fourth quadrant such that the maximum area of ΔACD is 12 square units, then a is equal to _____

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

EdLoop JEE

Q106 JEE Main 2022 · 24 Jun · Shift 2 MCQ

Let the area of the triangle with vertices $A(1, \alpha)$, $B(\alpha, 0)$ and $C(0, \alpha)$ be 4 sq. units. If the points $(\alpha, -\alpha)$, $(-\alpha, \alpha)$ and (α^2, β) are collinear, then β is equal to

(A) 64
(B) -8
(C) -64
(D) 512

Answer: (C) -64 · Key from source paper

Q107 JEE Main 2021 · 1 Sep · Shift 2 Numerical

Let the points of intersections of the lines $x - y + 1 = 0$, $x - 2y + 3 = 0$ and $2x - 5y + 11 = 0$ are the mid points of the sides of a triangle ABC. Then the area of the triangle ABC is

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q108 JEE Main 2021 · 1 Sep · Shift 2 Numerical

A man starts walking from the point $P\,(-3, 4)$, touches the x-axis at R, and then turns to reach at the point $Q\,(0, 2)$. The man is walking at a constant speed. If the man reaches the point Q in the minimum time, then $50\left[(PR)^2 + (RQ)^2\right]$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 1250. · Key from source paper

Q109 JEE Main 2021 · 31 Aug · Shift 1 MCQ

If p and q are the lengths of the perpendiculars from the origin on the lines, $x\,\mathrm{cosec}\,\alpha - y\sec\alpha = k\cot 2\alpha$ and $x\sin\alpha + y\cos\alpha = k\sin 2\alpha$ respectively, then k^2 is equal to :

(A) $2p^2 + q^2$
(B) $p^2 + 2q^2$
(C) $4q^2 + p^2$
(D) $4p^2 + q^2$

Answer: (D) $4p^2 + q^2$ · Key from source paper

Q110 JEE Main 2021 · 31 Aug · Shift 2 MCQ

Let A be the set of all points α, β such that the area of triangle formed by the points 5, 6, 3, 2 and α, β is 12 square units. Then the least possible length of a line segment joining the origin to a point in A , is :

(A) $\frac{8}{\sqrt{5}}$
(B) $\frac{12}{\sqrt{5}}$
(C) $\frac{16}{\sqrt{5}}$
(D) $\frac{4}{\sqrt{5}}$

Answer: (A) $\frac{8}{\sqrt{5}}$ · Key from source paper

Q111 JEE Main 2021 · 27 Aug · Shift 1 MCQ

Let A be a fixed point $(0, 6)$ and B be a moving point $(2t, 0)$. Let M be the mid-point of AB and the perpendicular bisector of AB meets the y-axis at C. The locus of the mid-point P of MC is

(A) $3x^2 + 2y - 6 = 0$
(B) $2x^2 - 3y + 9 = 0$
(C) $3x^2 - 2y - 6 = 0$
(D) $2x^2 + 3y - 9 = 0$

Answer: (D) $2x^2 + 3y - 9 = 0$ · Key from source paper

Q112 JEE Main 2021 · 27 Aug · Shift 2 MCQ

Let $A(a,\ 0)$, $B(b,\ 2b+1)$ and $C(0, b)$, $b \neq 0$, $|b| \neq 1$, be points such that the area of triangle ABC is 1 sq. unit, then the sum of all possible values of a is:

(A) $\frac{-2b}{b+1}$
(B) $\frac{2b^2}{b+1}$
(C) $\frac{-2b^2}{b+1}$
(D) $\frac{2b}{b+1}$

Answer: (C) $\frac{-2b^2}{b+1}$ · Key from source paper

Q113 JEE Main 2021 · 26 Aug · Shift 1 MCQ

Let ABC be a triangle with $A(-3, 1)$ and $\angle ACB = \theta, 0 < \theta < \frac{\pi}{2}$. If the equation of the median through B is $2x + y - 3 = 0$ and the equation of angle bisector of C is $7x - 4y - 1 = 0$, then $\tan\theta$ is equal to:

(A) $\frac{3}{4}$
(B) $\frac{4}{3}$
(C) 2
(D) $\frac{1}{2}$

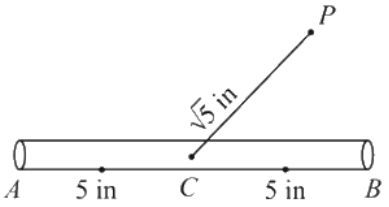
Answer: (B) $\frac{4}{3}$ · Key from source paper

Q114 JEE Main 2021 · 26 Aug · Shift 2 MCQ

A 10 inches long pencil AB with mid point C and a small eraser P are placed on the horizontal top of a table such that $PC = \sqrt{5}$ inches and $\angle PCB = \tan^{-1}(2)$. The acute angle through which the pencil must be rotated about C so that the perpendicular distance between eraser and pencil becomes exactly 1 inch is :

(see the figure above)

Q62. A 10 inches long pencil AB with mid point C and a small eraser P are placed on the horizontal top of a table such that $PC = \sqrt{5}$ inches and $\angle PCB = \tan^{-1}(2)$. The acute angle through which the pencil must be rotated about C so that the perpendicular distance between eraser and pencil becomes exactly 1 inch is :



(1) $\tan^{-1}\left(\frac{3}{4}\right)$
(2) $\tan^{-1}\left(\frac{1}{2}\right)$
(3) $\tan^{-1}\left(\frac{4}{3}\right)$
(4) $\tan^{-1}(1)$

(A) $\tan^{-1}\left(\frac{3}{4}\right)$
(B) $\tan^{-1}\left(\frac{1}{2}\right)$
(C) $\tan^{-1}\left(\frac{4}{3}\right)$
(D) $\tan^{-1}(1)$

Answer: (A) $\tan^{-1}\left(\frac{3}{4}\right)$ · Key from source paper

Q115 JEE Main 2021 · 27 Jul · Shift 2 MCQ

The point $P(a, b)$ undergoes the following three transformations successively:
(a) reflection about the line $y = x$.
(b) translation through 2 units along the positive direction of $x-$ axis.
(c) rotation through angle $\frac{\pi}{4}$ about the origin in the anti-clockwise direction.
If the co-ordinates of the final position of the point P are $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$, then the value of $2a + b$ is equal to:

(A) 13
(B) 9
(C) 5
(D) 7

Answer: (B) 9 · Key from source paper

Q116 JEE Main 2021 · 27 Jul · Shift 2 MCQ

Two sides of a parallelogram are along the lines $4x + 5y = 0$ and $7x + 2y = 0$. If the equation of one of the diagonals of the parallelogram is $11x + 7y = 9$, then other diagonal passes through the point:

(A) $(1, 2)$
(B) $(2, 2)$
(C) $(2, 1)$
(D) $(1, 3)$

Answer: (B) $(2, 2)$ · Key from source paper

Q117 JEE Main 2021 · 25 Jul · Shift 2 MCQ

Let the equation of the pair of lines, $y = px$ and $y = qx$, can be written as $(y - px)(y - qx) = 0$. Then the equation of the pair of the angle bisectors of the lines $x^2 - 4xy - 5y^2 = 0$ is:

(A) $x^2 - 3xy + y^2 = 0$
(B) $x^2 + 4xy - y^2 = 0$
(C) $x^2 + 3xy - y^2 = 0$
(D) $x^2 - 3xy - y^2 = 0$

Answer: (C) $x^2 + 3xy - y^2 = 0$ · Key from source paper

Q118 JEE Main 2021 · 20 Jul · Shift 2 MCQ

Let P be a variable point on the parabola $y = 4x^2 + 1$. Then, the locus of the mid-point of the point P and the foot of the perpendicular drawn from the point P to the line $y = x$ is:

(A) $(3x - y)^2 + (x - 3y) + 2 = 0$
(B) $2(3x - y)^2 + (x - 3y) + 2 = 0$
(C) $(3x - y)^2 + 2(x - 3y) + 2 = 0$
(D) $2(x - 3y)^2 + (3x - y) + 2 = 0$

Answer: (B) $2(3x - y)^2 + (x - 3y) + 2 = 0$ · Key from source paper

Q119 JEE Main 2021 · 20 Jul · Shift 2 Numerical

Consider a triangle having vertices $A(-2, 3)$, $B(1, 9)$ and $C(3, 8)$. If a line L passing through the circumcentre of triangle ABC, bisects line BC, and intersects y-axis at point $\left(0, \frac{\alpha}{2}\right)$, then the value of real number α is _____ .

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q120 JEE Main 2021 · 18 Mar · Shift 1 MCQ

The number of integral values of m so that the abscissa of point of intersection of lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer, is:

(A) 1
(B) 2
(C) 3
(D) 0

Answer: (B) 2 · Key from source paper

Q121 JEE Main 2021 · 18 Mar · Shift 1 MCQ

The equation of one of the straight lines which passes through the point $(1, 3)$ and makes an angles $\tan^{-1}\left(\sqrt{2}\right)$ with the straight line, $y + 1 = 3\sqrt{2}x$ is

(A) $4\sqrt{2}x + 5y - \left(15 + 4\sqrt{2}\right) = 0$
(B) $5\sqrt{2}x + 4y - \left(15 + 4\sqrt{2}\right) = 0$
(C) $4\sqrt{2}x + 5y - 4\sqrt{2} = 0$
(D) $4\sqrt{2}x - 5y - \left(5 + 4\sqrt{2}\right) = 0$

Answer: (A) $4\sqrt{2}x + 5y - \left(15 + 4\sqrt{2}\right) = 0$ · Key from source paper

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Q122 JEE Main 2021 · 18 Mar · Shift 1 MCQ

A vector $\vec{a}$ has components $3p$ and 1 with respect to a rectangular cartesian system. This system is rotated through a certain angle about the origin in the counter clockwise sense. If, with respect to new system, $\vec{a}$ has components $p + 1$ and $\sqrt{10}$, then a value of p is equal to:

(A) 1
(B) $-\frac{5}{4}$
(C) $\frac{4}{5}$
(D) -1

Answer: (D) -1 · Key from source paper

Q123 JEE Main 2021 · 18 Mar · Shift 2 MCQ

Let the centroid of an equilateral triangle ABC be at the origin. Let one of the sides of the equilateral triangle be along the straight line $x + y = 3$. If R and r be the radius of circumcircle and incircle respectively of ΔABC, then $(R + r)$ is equal to :

(A) $\frac{9}{\sqrt{2}}$
(B) $7\sqrt{2}$
(C) $2\sqrt{2}$
(D) $3\sqrt{2}$

Answer: (A) $\frac{9}{\sqrt{2}}$ · Key from source paper

Q124 JEE Main 2021 · 17 Mar · Shift 1 MCQ

In a triangle PQR, the co-ordinates of the points P and Q are $(-2, 4)$ and $(4, -2)$ respectively. If the equation of the perpendicular bisector of PR is $2x - y + 2 = 0$, then the centre of the circumcircle of the ΔPQR is:

(A) $(-1, 0)$
(B) $(-2, -2)$
(C) $(0, 2)$
(D) $(1, 4)$

Answer: (B) $(-2, -2)$ · Key from source paper

Q125 JEE Main 2021 · 17 Mar · Shift 2 Numerical

Let $\tan\alpha, \tan\beta$ and $\tan\gamma; \alpha, \beta, \gamma \neq \frac{(2n-1)\pi}{2}, n \in N$ be the slopes of the three line segments OA, OB and OC, respectively, where O is origin. If circumcentre of $\triangle ABC$ coincides with origin and its orthocentre lies on y-axis, then the value of $\left(\frac{\cos 3\alpha+\cos 3\beta+\cos 3\gamma}{\cos\alpha\cdot\cos\beta\cdot\cos\gamma}\right)^2$ is equal to :

Numerical value type: the answer is a number.

Answer: 144. · Key from source paper

Q126 JEE Main 2021 · 16 Mar · Shift 2 MCQ

Let $A(-1, 1)$, $B(3, 4)$ and $C(2, 0)$ be given three points. A line $y = mx$, $m > 0$, intersects lines AC and BC at point P and Q respectively. Let A_1 and A_2 be the areas of ΔABC and ΔPQC respectively, such that $A_1 = 3A_2$, then the value of m is equal to :

(A) $\frac{4}{15}$
(B) 1
(C) 2
(D) 3

Answer: (B) 1 · Key from source paper

Q127 JEE Main 2021 · 26 Feb · Shift 1 MCQ

The intersection of three lines $x - y = 0,\ x + 2y = 3$ and $2x + y = 6$ is a/an

(A) Isosceles triangle
(B) Equilateral triangle
(C) Right angled triangle
(D) None of the above

Answer: (A) Isosceles triangle · Key from source paper

Q128 JEE Main 2021 · 25 Feb · Shift 1 MCQ

The image of the point $(3, 5)$ in the line $x - y + 1 = 0$, lies on :

(A) $(x-2)^2 + (y-4)^2 = 4$
(B) $(x-4)^2 + (y-4)^2 = 8$
(C) $(x-4)^2 + (y+2)^2 = 16$
(D) $(x-2)^2 + (y-2)^2 = 12$

Answer: (A) $(x-2)^2 + (y-4)^2 = 4$ · Key from source paper

Q129 JEE Main 2021 · 25 Feb · Shift 2 MCQ

If the curve $x^2 + 2y^2 = 2$ intersects the line $x + y = 1$ at two points P and Q, then the angle subtended by the line segment PQ at the origin is

(A) $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{3}\right)$
(B) $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{3}\right)$
(C) $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$
(D) $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{4}\right)$

Answer: (C) $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$ · Key from source paper

Q130 JEE Main 2021 · 24 Feb · Shift 1 MCQ

A man is walking on a straight line. The arithmetic mean of the reciprocals of the intercepts of this line on the coordinate axes is $\frac{1}{4}$. Three stones A, B and C are placed at the points $1, 1, 2, 2$ and $4, 4$ respectively. Then which of these stones is / are on the path of the man?

(A) C only
(B) All the three
(C) B only
(D) A only

Answer: (C) B only · Key from source paper

Q131 JEE Main 2020 · 6 Sep · Shift 1 MCQ

A ray of light coming from the point $\left(2, 2\sqrt{3}\right)$ is incident at an angle 30° on the line $x = 1$ at the point A. The ray gets reflected on the line $x = 1$ and meets x -axis at the point B. Then, the line AB passes through the point

(A) $\left(3, -\frac{1}{\sqrt{3}}\right)$
(B) $\left(4, -\frac{\sqrt{3}}{2}\right)$
(C) $\left(3, -\sqrt{3}\right)$
(D) $\left(4, -\sqrt{3}\right)$

Answer: (C) $\left(3, -\sqrt{3}\right)$ · Key from source paper

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Q132 JEE Main 2020 · 6 Sep · Shift 2 MCQ

Let L denote the line in the xy-plane with x and y intercepts as 3 and 1 respectively. Then the image of the point$(-1, -4)$ in the line is :

(A) $\left(\frac{11}{5}, \frac{28}{5}\right)$
(B) $\left(\frac{29}{5}, \frac{8}{5}\right)$
(C) $\left(\frac{8}{5}, \frac{29}{5}\right)$
(D) $\left(\frac{29}{5}, \frac{11}{5}\right)$

Answer: (A) $\left(\frac{11}{5}, \frac{28}{5}\right)$ · Key from source paper

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Q133 JEE Main 2020 · 5 Sep · Shift 1 Numerical

If the line, $2x - y + 3 = 0$ is at a distance $\frac{1}{\sqrt{5}}$ and $\frac{2}{\sqrt{5}}$ from the lines $4x - 2y + \alpha = 0$ and $6x - 3y + \beta = 0$ respectively, then the sum of all possible values of α and β is _____.

Numerical value type: the answer is a number.

Answer: 30. · Key from source paper

Q134 JEE Main 2020 · 4 Sep · Shift 1 MCQ

A triangle ABC lying in the first quadrant has two vertices as $A(1, 2)$ and $B(3, 1)$. If$\angle BAC = 90^\circ$,and ar $(\Delta\ \mathrm{ABC}) = 5\sqrt{5}$ sq. units, then the abscissa of the vertex C is :

(A) $1 + \sqrt{5}$
(B) $1 + 2\sqrt{5}$
(C) $2 + \sqrt{5}$
(D) $2\sqrt{5} - 1$

Answer: (B) $1 + 2\sqrt{5}$ · Key from source paper

Q135 JEE Main 2020 · 4 Sep · Shift 2 MCQ

If the perpendicular bisector of the line segment joining the points $P(1, 4)$ and $Q(k, 3)$ has y-intercept equal to -4, then a value of k is;

(A) -2
(B) -4
(C) $\sqrt{14}$
(D) $\sqrt{15}$

Answer: (B) -4 · Key from source paper

Q136 JEE Main 2020 · 3 Sep · Shift 2 MCQ

If a ΔABC has vertices $A(-1,7)$, $B(-7,1)$ and $C(5,-5)$, then its orthocentre has coordinates:

(A) $(-3,3)$
(B) $(3,-3)$
(C) $\left(-\frac{3}{5},\frac{3}{5}\right)$
(D) $\left(\frac{3}{5},-\frac{3}{5}\right)$

Answer: (A) $(-3,3)$ · Key from source paper

Q137 JEE Main 2020 · 2 Sep · Shift 2 MCQ

The set of all possible values of θ in the interval $(0,\pi)$ for which the points$(1,2)$ and $(\sin\theta,\cos\theta)$ lie on the same side of the line $x+y=1$ is?

(A) $\left(0,\frac{\pi}{2}\right)$
(B) $\left(\frac{\pi}{4},\frac{3\pi}{4}\right)$
(C) $\left(0,\frac{3\pi}{4}\right)$
(D) $\left(0,\frac{\pi}{4}\right)$

Answer: (A) $\left(0,\frac{\pi}{2}\right)$ · Key from source paper

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Q138 JEE Main 2020 · 9 Jan · Shift 1 MCQ

Let D be the centroid of the triangle with vertices $(3,-1)$, $(1,3)$ and $(2,4)$. Let P be the point of intersection of the lines $x+3y-1=10$ and $3x-y+1=0$. Then, the line passing through the points D and P also passes through the point:

(A) $(-9,-6)$
(B) $(9,7)$
(C) $(7,6)$
(D) $(-9,-7)$

Answer: (A) $(-9,-6)$ · Key from source paper

Q139 JEE Main 2020 · 8 Jan · Shift 1 MCQ

Let two points be $A(1,-1)$ and $B(0,2)$. If a point $P(x',y')$ be such that the area of $\Delta PAB=5$ sq. units and it lies on the line $3x+y-4\lambda=0$, then a value of λ is

(A) 4
(B) 3
(C) 1
(D) -3

Answer: (B) 3 · Key from source paper

Q140 JEE Main 2020 · 7 Jan · Shift 1 Numerical

Let $A(1,0), B(6,2)$ and $C\left(\frac{3}{2}, 6\right)$ be the vertices of a triangle ABC. If P is a point inside the triangle ABC such that the triangles APC, APB and BPC have equal areas, then the length of the line segment PQ, where Q is the point $\left(-\frac{7}{6}, -\frac{1}{3}\right)$, is

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q141 JEE Main 2020 · 7 Jan · Shift 2 MCQ

The locus of the mid-points of the perpendiculars drawn from points on the line $x = 2y$, to the line $x = y$, is.

(A) $2x - 3y = 0$
(B) $5x - 7y = 0$
(C) $3x - 2y = 0$
(D) $7x - 5y = 0$

Answer: (B) $5x - 7y = 0$ · Key from source paper

Q142 JEE Main 2019 · 12 Apr · Shift 2 MCQ

A triangle has a vertex at $(1,\ 2)$ and the mid points of the two sides through it are $(-1,\ 1)$ and $(2,\ 3)$. Then the centroid of this triangle is:

(A) $\left(\frac{1}{3}, 1\right)$
(B) $\left(1, \frac{7}{3}\right)$
(C) $\left(\frac{1}{3}, 2\right)$
(D) $\left(\frac{1}{3}, \frac{5}{3}\right)$

Answer: (C) $\left(\frac{1}{3}, 2\right)$ · Key from source paper

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Q143 JEE Main 2019 · 12 Apr · Shift 2 MCQ

A straight line L at a distance of 4 units from the origin makes positive intercepts on the coordinate axes and the perpendicular from the origin to this line makes an angle of 60° with the line $x + y = 0$. Then an equation of the line L is:
Note: In actual JEE Main paper, two options were correct for this question. Hence, we have changed one option.

EdLoop JEE

(A) $\left(\sqrt{3}+1\right)x+\left(\sqrt{3}-1\right)y=8\sqrt{2}$
(B) $x+\sqrt{3}y=8$
(C) $\sqrt{3}x+y=8$
(D) $\left(\sqrt{3}-1\right)x+\sqrt{3}y=8\sqrt{2}$

Answer: (A) $\left(\sqrt{3}+1\right)x+\left(\sqrt{3}-1\right)y=8\sqrt{2}$ · Key from source paper

Q144 JEE Main 2019 · 10 Apr · Shift 2 MCQ

Lines are drawn parallel to the line $4x-3y+2=0$, at a distance $\frac{3}{5}$ units from the origin. Then which one of the following points lies on any of these lines?

(A) $\frac{1}{4},-\frac{1}{3}$
(B) $-\frac{1}{4},\frac{2}{3}$
(C) $-\frac{1}{4},-\frac{2}{3}$
(D) $\frac{1}{4},\frac{1}{3}$

Answer: (B) $-\frac{1}{4},\frac{2}{3}$ · Key from source paper

Q145 JEE Main 2019 · 9 Apr · Shift 1 MCQ

Slope of a line passing through $P(2,3)$ and intersecting the line $x+y=7$ at a distance of 4 units from P, is

(A) $\frac{\sqrt{7}-1}{\sqrt{7}+1}$
(B) $\frac{1-\sqrt{7}}{1+\sqrt{7}}$
(C) $\frac{\sqrt{5}-1}{\sqrt{5}+1}$
(D) $\frac{1-\sqrt{5}}{1+\sqrt{5}}$

Answer: (B) $\frac{1-\sqrt{7}}{1+\sqrt{7}}$ · Key from source paper

Q146 JEE Main 2019 · 9 Apr · Shift 1 MCQ

If a tangent to the circle $x^2+y^2=1$ intersects the coordinate axes at distinct points P and Q, then the locus of the mid-point of PQ is:

(A) $x^2+y^2-16x^2y^2=0$
(B) $x^2+y^2-4x^2y^2=0$
(C) $x^2+y^2-2xy=0$
(D) $x^2+y^2-2x^2y^2=0$

Answer: (B) $x^2+y^2-4x^2y^2=0$ · Key from source paper

Q147 JEE Main 2019 · 9 Apr · Shift 2 MCQ

If the two lines $x+(a-1)y=1$ and $2x+a^2y=1$, $(a \in R-\{0,1\})$ are perpendicular, then the distance of their point of intersection from the origin is

(A) $\frac{2}{\sqrt{5}}$
(B) $\frac{\sqrt{2}}{5}$
(C) $\frac{2}{5}$
(D) $\sqrt{\frac{2}{5}}$

Answer: (D) $\sqrt{\frac{2}{5}}$ · Key from source paper

Q148 JEE Main 2019 · 8 Apr · Shift 1 MCQ

A point on the straight line, $3x+5y=15$ which is equidistant from the coordinate axes will lie only in:

(A) 1st and 2nd quadrants
(B) 1st, 2nd and 4th quadrants
(C) 1st quadrant
(D) 4th quadrant

Answer: (A) 1st and 2nd quadrants · Key from source paper

Q149 JEE Main 2019 · 8 Apr · Shift 2 MCQ

Suppose that the points h, k, 1, 2 and -3, 4 lie on the line L_1. If a line L_2 passing through the points h, k and 4, 3 is perpendicular to L_1, then $\frac{k}{h}$ equals:

(A) $-\frac{1}{7}$
(B) 3
(C) 0
(D) $\frac{1}{3}$

Answer: (D) $\frac{1}{3}$ · Key from source paper

Q150 JEE Main 2019 · 12 Jan · Shift 1 MCQ

If the straight line $2x-3y+17=0$ is perpendicular to the line passing through the points $(7,17)$ and $(15,\ \beta)$, then β equals :

(A) -5
(B) $\frac{35}{3}$
(C) 5
(D) $-\frac{35}{3}$

Answer: (C) 5 · Key from source paper

Q151 JEE Main 2019 · 12 Jan · Shift 2 MCQ

If a straight line passing through the point $P(-3,\ 4)$ is such that its intercepted portion between the coordinate axes is bisected at P, then its equation is :

(A) $4x + 3y = 0$
(B) $4x - 3y + 24 = 0$
(C) $3x - 4y + 25 = 0$
(D) $x - y + 7 = 0$

Answer: (B) $4x - 3y + 24 = 0$ · Key from source paper

Q152 JEE Main 2019 · 11 Jan · Shift 2 MCQ

If in a parallelogram ABDC, the coordinates of A, B and C are respectively (1,2),(3,4) and (2, 5), then the equation of the diagonal AD is :

(A) $5x - 3y + 1 = 0$
(B) $5x + 3y - 11 = 0$
(C) $3x - 5y + 7 = 0$
(D) $3x + 5y - 13 = 0$

Answer: (A) $5x - 3y + 1 = 0$ · Key from source paper

Q153 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Let $\sqrt{3}\hat{i} + \hat{j}$, $\hat{i} + \sqrt{3}\hat{j}$ and $\beta\hat{i} + (1-\beta)\hat{j}$ respectively be the position vectors of the points A, B and C with respect to the origin O. If the distance of C from the bisector of the acute angle between OA and OB is $\frac{3}{\sqrt{2}}$, then the sum of all possible values of β is:

(A) 4
(B) 3
(C) 2
(D) 1

Answer: (D) 1 · Key from source paper

Q154 JEE Main 2019 · 10 Jan · Shift 1 MCQ

If the line $3x + 4y - 24 = 0$ intersects the x-axis is at the point A and the y-axis at the point B, then the incentre of the triangle OAB, where O is the origin, is:

(A) $(4,\ 4)$
(B) $(3,\ 4)$
(C) $(4,\ 3)$
(D) $(2,\ 2)$

Answer: (D) $(2,\ 2)$ · Key from source paper

Q155 JEE Main 2019 · 10 Jan · Shift 1 MCQ

A point P moves on the line $2x - 3y + 4 = 0$. If $Q(1,\ 4)$ and $R(3,\ -2)$ are fixed points, then the locus of the centroid of $\triangle PQR$ is a line:

(A) with slope $\frac{2}{3}$
(B) with slope $\frac{3}{2}$
(C) parallel to y-axis
(D) parallel to x-axis

Answer: (A) with slope $\frac{2}{3}$ · Key from source paper

Q156 JEE Main 2019 · 10 Jan · Shift 2 MCQ

Two vertices of a triangle are $(0, 2)$ and $(4, 3)$. If its orthocenter is at the origin, then its third vertex lies in which quadrant?

(A) Fourth
(B) Second
(C) Third
(D) First

Answer: (B) Second · Key from source paper

Q157 JEE Main 2019 · 10 Jan · Shift 2 MCQ

Two sides of a parallelogram are along the lines, $x + y = 3$ and $x - y + 3 = 0$. If its diagonals intersect at $(2, 4)$, then one of its vertex is:

(A) $(3, 6)$
(B) $(2, 6)$
(C) $(2, 1)$
(D) $(3, 5)$

Answer: (A) $(3, 6)$ · Key from source paper

Q158 JEE Main 2019 · 9 Jan · Shift 1 MCQ

Consider the set of all lines $px + qy + r = 0$ such that $3p + 2q + 4r = 0$. Which one of the following statements is true?

(A) The lines are not concurrent.

(B) The lines are concurrent at the point $\frac{3}{4}, \frac{1}{2}$.

(C) The lines are all parallel.

(D) Each line passes through the origin.

Answer: (B) The lines are concurrent at the point $\frac{3}{4}, \frac{1}{2}$. · Key from source paper

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Q159 JEE Main 2019 · 9 Jan · Shift 2 MCQ

Let the equations of two sides of a triangle be $3x - 2y + 6 = 0$ and $4x + 5y - 20 = 0$. If the orthocenter of this triangle is at $(1,\ 1)$ then the equation of it's third side is:

(A) $122y + 26x + 1675 = 0$

(B) $26x - 122y - 1675 = 0$

(C) $26x + 61y + 1675 = 0$

(D) $122y - 26x - 1675 = 0$

Answer: (B) $26x - 122y - 1675 = 0$ · Key from source paper

Q160 JEE Main 2018 · 15 Apr · Shift 1 MCQ

In a triangle ABC, coordianates (sic) of A are $(1, 2)$ and the equations of the medians through B and C are $x + y = 5$ and $x = 4$ respectively. Then area of $\triangle ABC$ (in sq. units) is

(A) 5

(B) 9

(C) 12

(D) 4

Answer: (B) 9 · Key from source paper

Q161 JEE Main 2018 · 15 Apr · Shift 2 MCQ

The foot of the perpendicular drawn from the origin, on the line, $3x + y = \lambda(\lambda \neq 0)$ is P. If the line meets x-axis at A and y-axis at B, then the ratio $BP : PA$ is

(A) $9 : 1$

(B) $1 : 3$

(C) $1 : 9$

(D) $3 : 1$

Answer: (A) $9 : 1$ · Checked by our team

Q162 JEE Main 2018 · 15 Apr · Shift 2 MCQ

The sides of a rhombus $ABCD$ are parallel to the lines, $x - y + 2 = 0$ and $7x - y + 3 = 0$. If the diagonals of the rhombus intersect at $P(1, 2)$ and the vertex A (different from the origin) is on the y

axis, then the ordinate of A is

(A) 2
(B) $\frac{7}{4}$
(C) $\frac{7}{2}$
(D) $\frac{5}{2}$

Answer: (D) $\frac{5}{2}$ · Key from source paper

Q163 JEE Main 2018 · 8 Apr · Offline MCQ

A straight line through a fixed point $(2, 3)$ intersects the coordinate axes at distinct points P and Q. If O is the origin and the rectangle $OPRQ$ is completed, then the locus of R is:

(A) $3x + 2y = 6xy$
(B) $3x + 2y = 6$
(C) $2x + 3y = xy$
(D) $3x + 2y = xy$

Answer: (D) $3x + 2y = xy$ · Key from source paper

Q164 JEE Main 2018 · 8 Apr · Offline MCQ

Let the orthocentre and centroid of a triangle be $A(-3,\ 5)$ and $B(3,\ 3)$ respectively. If C is the circumcentre of this triangle, then the radius of the circle having line segment AC as diameter, is:

(A) $\frac{3\sqrt{5}}{2}$
(B) $\sqrt{10}$
(C) $2\sqrt{10}$
(D) $3\sqrt{\frac{5}{2}}$

Answer: (D) $3\sqrt{\frac{5}{2}}$ · Key from source paper

Q165 JEE Main 2017 · 9 Apr · Online MCQ

A square, of each side 2, lies above the x-axis and has one vertex at the origin. If one of the sides passing through the origin makes an angle 30° with the positive direction of the x-axis , then the sum of the x-coordinates of the vertices of the square is:

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(A) $2\sqrt{3}-2$
(B) $\sqrt{3}-2$
(C) $2\sqrt{3}-1$
(D) $\sqrt{3}-1$

Answer: (A) $2\sqrt{3}-2$ · Key from source paper

Q166 JEE Main 2017 · 2 Apr · Offline MCQ

Let k be an integer such that the triangle with vertices $(k, -3k)$, $(5, k)$ and $(-k, 2)$ has area 28 sq. units. Then the orthocenter of this triangle is at the point:

(A) $\left(2, -\frac{1}{2}\right)$
(B) $\left(1, \frac{3}{4}\right)$
(C) $\left(1, -\frac{3}{4}\right)$
(D) $\left(2, \frac{1}{2}\right)$

Answer: (D) $\left(2, \frac{1}{2}\right)$ · Key from source paper

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Q167 JEE Main 2016 · 10 Apr · Online MCQ

A straight line through origin O meets the lines $3y = 10 - 4x$ and $8x + 6y + 5 = 0$ at points A and B respectively. Then, O divides the segment AB in the ratio

(A) $2 : 3$
(B) $1 : 2$
(C) $4 : 1$
(D) $3 : 4$

Answer: (C) $4 : 1$ · Key from source paper

Q168 JEE Main 2016 · 10 Apr · Online MCQ

A ray of light is incident along a line which meets another line $7x - y + 1 = 0$ at the point $(0, 1)$. The ray is then reflected from this point along the line $y + 2x = 1$. Then the equation of the line of incidence of the ray of light is :

(A) $41x - 25y + 25 = 0$
(B) $41x + 25y - 25 = 0$
(C) $41x - 38y + 38 = 0$
(D) $41x + 38y - 38 = 0$

Answer: (C) $41x - 38y + 38 = 0$ · Key from source paper

Q169 JEE Main 2016 · 9 Apr · Online MCQ

If a variable line drawn through the intersection of the lines $\frac{x}{3} + \frac{y}{4} = 1$ and $\frac{x}{4} + \frac{y}{3} = 1$, meets the coordinate axes at A and B, $(A \neq B)$,then the locus of the midpoint of AB is:

(A) $7xy = 6(x + y)$
(B) $4(x + y)^2 - 28(x + y) + 49 = 0$
(C) $6xy = 7(x + y)$
(D) $14(x + y)^2 - 97(x + y) + 168 = 0$

Answer: (A) $7xy = 6(x + y)$ · Key from source paper

Q170 JEE Main 2016 · 9 Apr · Online MCQ

The point $(2, 1)$ is translated parallel to the line $L : x - y = 4$ by $2\sqrt{3}$ units. If the new point Q lies in the third quadrant, then the equation of the line passing through Q and perpendicular to L is

(A) $x + y = 2 - \sqrt{6}$
(B) $2x + 2y = 1 - \sqrt{6}$
(C) $x + y = 3 - 3\sqrt{6}$
(D) $x + y = 3 - 2\sqrt{6}$

Answer: (D) $x + y = 3 - 2\sqrt{6}$ · Key from source paper

Q171 JEE Main 2016 · 3 Apr · Offline MCQ

Two sides of a rhombus are along the lines, $x - y + 1 = 0$ and $7x - y - 5 = 0$. If its diagonals intersect at $(-1,\ -2)$, then which one of the following is a vertex of this rhombus ?

(A) $\left(\frac{1}{3},\ -\frac{8}{3}\right)$
(B) $\left(-\frac{10}{3},\ -\frac{7}{3}\right)$
(C) $(-3,\ -9)$
(D) $(-3,\ -8)$

Answer: (A) $\left(\frac{1}{3},\ -\frac{8}{3}\right)$ · Key from source paper

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Q172 JEE Main 2015 · 11 Apr · Online MCQ

A straight line L through the point $(3, -2)$ is inclined at an angle of 60° to the line $\sqrt{3}x + y = 1$. If L also intersects the X-axis, then the equation of L is:

(A) $y + \sqrt{3}\,x + 2 - 3\sqrt{3} = 0$
(B) $\sqrt{3}\,y - x + 3 + 2\sqrt{3} = 0$
(C) $\sqrt{3}\,y + x - 3 + 2\sqrt{3} = 0$
(D) $y - \sqrt{3}x + 2 + 3\sqrt{3} = 0$

Answer: (D) $y - \sqrt{3}x + 2 + 3\sqrt{3} = 0$ · Key from source paper

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Q173 JEE Main 2015 · 11 Apr · Online MCQ

If the incentre of an equilateral triangle is $(1, 1)$ and the equation of its one side is $3x + 4y + 3 = 0$, then the equation of the circumcircle of this triangle is:

(A) $x^2 + y^2 - 2x - 2y - 2 = 0$
(B) $x^2 + y^2 - 2x - 2y + 2 = 0$
(C) $x^2 + y^2 - 2x - 2y - 7 = 0$
(D) $x^2 + y^2 - 2x - 2y - 14 = 0$

Answer: (D) $x^2 + y^2 - 2x - 2y - 14 = 0$ · Key from source paper

Q174 JEE Main 2015 · 10 Apr · Online MCQ

Let L be the line passing through the point $P(1, 2)$ such that its intercepted segment between the co-ordinate axes is bisected at P. If L_1 is the line perpendicular to L and passing through the point $(-2, 1)$, then the point of intersection of L and L_1 is

(A) $\left(\frac{3}{5}, \frac{23}{10}\right)$
(B) $\left(\frac{4}{5}, \frac{12}{5}\right)$
(C) $\left(\frac{11}{20}, \frac{29}{10}\right)$
(D) $\left(\frac{3}{10}, \frac{17}{5}\right)$

Answer: (B) $\left(\frac{4}{5}, \frac{12}{5}\right)$ · Key from source paper

Q175 JEE Main 2015 · 10 Apr · Online MCQ

The points $\left(0, \frac{8}{3}\right)$, $(1, 3)$ and $(82, 30)$

(A) form an obtuse angled triangle
(B) form an acute angled triangle
(C) lie on a straight line
(D) form a right angled triangle

Answer: (C) lie on a straight line · Key from source paper

Q176 JEE Main 2015 · 4 Apr · Offline MCQ

Locus of the image of the point $(2, 3)$ in the line $(2x - 3y + 4) + k(x - 2y + 3) = 0$, $k \in R$, is a

(A) Circle of radius $\sqrt{3}$
(B) Straight line parallel to x-axis
(C) Straight line parallel to y-axis.
(D) Circle of radius $\sqrt{2}$

Answer: (D) Circle of radius $\sqrt{2}$ · Key from source paper

Q177 JEE Main 2014 · 19 Apr · Online MCQ

If a line L is perpendicular to the line $5x - y = 1$, and the area of the triangle formed by the line L and the coordinate axes is 5 sq units, then the distance of the line L from the line $x + 5y = 0$ is

(A) $\frac{7}{\sqrt{13}}$ units
(B) $\frac{7}{\sqrt{5}}$ units
(C) $\frac{5}{\sqrt{13}}$ units
(D) $\frac{5}{\sqrt{7}}$ units

Answer: (C) $\frac{5}{\sqrt{13}}$ units · Key from source paper

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Q178 JEE Main 2014 · 19 Apr · Online MCQ

The circumcentre of a triangle lies at the origin and its centroid is the midpoint of the line segment joining the points $(a^2+1,\ a^2+1)$ and $(2a\ ,\ -2\ a)$, $a \neq 0$. Then for any a, the orthocentre of this triangle lies on the line

(A) $y-(a^2+1)x=0$
(B) $y-2ax=0$
(C) $y+x=0$
(D) $(a-1)^2x-(a+1)^2y=0$

Answer: (D) $(a-1)^2x-(a+1)^2y=0$ · Key from source paper

Q179 JEE Main 2014 · 12 Apr · Online MCQ

If a line intercepted between the coordinate axes is trisected at a point A(4, 3), which is nearer to x-axis, then its equation is:

(A) $4x-3y=7$
(B) $3\mathrm{x}+2\mathrm{y}=18$
(C) $3x+8y=36$
(D) $x+3y=13$

Answer: (B) $3\mathrm{x}+2\mathrm{y}=18$ · Key from source paper

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Q180 JEE Main 2014 · 12 Apr · Online MCQ

If the three distinct lines $x+2ay+a=0, x+3by+b=0$ and $x+4ay+a=0$ are concurrent, then the point (a,b) lies on a :

(A) circle
(B) hyperbola
(C) straight line
(D) parabola

Answer: (C) straight line · Key from source paper

Q181 JEE Main 2014 · 11 Apr · Online MCQ

The base of an equilateral triangle is along the line given by $3x + 4y = 9$. If a vertex of the triangle is $(1, 2)$, then the length of a side of the triangle is:

(A) $\frac{2\sqrt{3}}{15}$
(B) $\frac{4\sqrt{3}}{15}$
(C) $\frac{4\sqrt{3}}{5}$
(D) $\frac{2\sqrt{3}}{5}$

Answer: (B) $\frac{4\sqrt{3}}{15}$ · Key from source paper

Q182 JEE Main 2014 · 11 Apr · Online MCQ

A stair-case of length l rests against a vertical wall and a floor of a room. Let P be a point on the stair-case, nearer to its end on the wall, that divides its length in the ratio $1 : 2$. If the staircase begins to slide on the floor, then the locus of P is:

(A) an ellipse of eccentricity $\frac{1}{2}$
(B) an ellipse of eccentricity $\frac{\sqrt{3}}{2}$
(C) a circle of radius $\frac{1}{2}$
(D) a circle of radius $\frac{\sqrt{3}}{2}l$

Answer: (B) an ellipse of eccentricity $\frac{\sqrt{3}}{2}$ · Key from source paper

Q183 JEE Main 2014 · 9 Apr · Online MCQ

Given three points P, Q, R with $P(5, 3)$ and R lies on the x-axis. If the equation of RQ is $x - 2y = 2$ and PQ is parallel to the x-axis, then the centroid of ΔPQR lies on the line

(A) $x - 2y + 1 = 0$
(B) $2x + y - 9 = 0$
(C) $2x - 5y = 0$
(D) $5x - 2y = 0$

Answer: (C) $2x - 5y = 0$ · Key from source paper

Q184 JEE Main 2014 · 9 Apr · Online MCQ

Let a and b be any two numbers satisfying $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{4}$. Then, the foot of perpendicular from the origin on the variable line $\frac{x}{a} + \frac{y}{b} = 1$ lies on :

(A) A circle of radius = 2
(B) A hyperbola with each semi-axis = $\sqrt{2}$.
(C) A hyperbola with each semi-axis = 2
(D) A circle of radius = $\sqrt{2}$

Answer: (A) A circle of radius = 2 · Key from source paper

Q185 JEE Main 2014 · 6 Apr · Offline MCQ

Let PS be the median of the triangle with vertices $P(2,2)$, $Q(6,-1)$ and $R(7,3)$. The equation of the line passing through $(1,-1)$ and parallel to PS is

(A) $4x+7y+3=0$
(B) $2x-9y-11=0$
(C) $4x-7y-11=0$
(D) $2x+9y+7=0$

Answer: (D) $2x+9y+7=0$ · Key from source paper

Q186 JEE Main 2014 · 6 Apr · Offline MCQ

Let a, b, c and d be non-zero numbers. If the point of intersection of the lines $4ax+2ay+c=0$ & $5bx+2by+d=0$ lies in the fourth quadrant and is equidistant from the two axes then

(A) $3bc-2ad=0$
(B) $3bc+2ad=0$
(C) $2bc-3ad=0$
(D) $2bc+3ad=0$

Answer: (A) $3bc-2ad=0$ · Key from source paper

Q187 JEE Main 2013 · 25 Apr · Online MCQ

If the image of point P(2, 3) in a line L is Q(4, 5), then the image of point R(0, 0) in the same line is:

(A) (2, 2)
(B) (4, 5)
(C) (3, 4)
(D) (7, 7)

Answer: (D) (7, 7) · Key from source paper

Q188 JEE Main 2013 · 25 Apr · Online MCQ

Let $A(-3,2)$ and $B(-2,1)$ be the vertices of a triangle ABC. If the centroid of this triangle lies on the line $3x+4y+2=0$, then the vertex C lies on the line :

(A) $4x + 3y + 5 = 0$
(B) $3x + 4y + 3 = 0$
(C) $4x + 3y + 3 = 0$
(D) $3x + 4y + 5 = 0$

Answer: (B) $3x + 4y + 3 = 0$ · Key from source paper

Q189 JEE Main 2013 · 23 Apr · Online MCQ

Let θ_1 be the angle between two lines $2x + 3y + c_1 = 0$ and $-x + 5y + c_2 = 0$ and θ_2 be the angle between two lines $2x + 3y + c_1 = 0$ and $-x + 5y + c_3 = 0$, where c_1, c_2, c_3 are any real numbers : Statement-1: If c_2 and c_3 are proportional, then $\theta_1 = \theta_2$. Statement-2: $\theta_1 = \theta_2$ for all c_2 and c_3.

(A) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation of Statement-1.
(B) Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation of Statement-1.
(C) Statement-1 is false; Statement- 2 is true.
(D) Statement-1 is true; Statement- 2 is false.

Answer: (A) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation of Statement-1. · Key from source paper

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Q190 JEE Main 2013 · 23 Apr · Online MCQ

If the extremities of the base of an isosceles triangle are the points $(2a, 0)$ and $(0, a)$ and the equation of one of the sides is $x = 2a$, then the area of the triangle, in square units, is :

(A) $\frac{5}{4}a^2$
(B) $\frac{5}{2}a^2$
(C) $\frac{25a^2}{4}$
(D) $5a^2$

Answer: (B) $\frac{5}{2}a^2$ · Key from source paper

Q191 JEE Main 2013 · 22 Apr · Online MCQ

If the x-intercept of some line L is double as that of the line, $3x + 4y = 12$ and the y-intercept of L is half as that of the same line, then the slope of L is :

(A) -3
(B) $-3/8$
(C) $-3/2$
(D) $-3/16$

Answer: (D) $-3/16$ · Key from source paper

Q192 JEE Main 2013 · 9 Apr · Online MCQ

A light ray emerging from the point source placed at $\mathrm{P}(1,3)$ is reflected at a point Q in the axis of x. If the reflected ray passes through the point $R\ (6,7)$, then the abscissa of Q is:

(A) 1
(B) 3
(C) $\frac{7}{2}$
(D) $\frac{5}{2}$

Answer: (D) $\frac{5}{2}$ · Key from source paper

Q193 JEE Main 2013 · 9 Apr · Online MCQ

If the three lines $x-3y=p$, $ax+2y=q$ and $ax+y=r$ form a right-angled triangle then :

(A) $a^2-9a+18=0$
(B) $a^2-6a-12=0$
(C) $a^2-6a-18=0$
(D) $a^2-9a+12=0$

Answer: (A) $a^2-9a+18=0$ · Key from source paper

Q194 JEE Main 2013 · 7 Apr · Offline MCQ

A ray of light along $x+\sqrt{3}y=\sqrt{3}$ gets reflected upon reaching $X-$axis, the equation of the reflected ray is

(A) $y=\sqrt{3}x-\sqrt{3}$
(B) $\sqrt{3}y=x-1$
(C) $y=x+\sqrt{3}$
(D) $\sqrt{3}y=x-\sqrt{3}$

Answer: (D) $\sqrt{3}y=x-\sqrt{3}$ · Key from source paper

Q195 JEE Main 2013 · 7 Apr · Offline MCQ

The $x-$coordinate of the incentre of the triangle that has the coordinates of midpoints of its sides as $(0,1)$, $(1,1)$ and $(1,0)$ is

(A) $1+\sqrt{2}$
(B) $1-\sqrt{2}$
(C) $2+\sqrt{2}$
(D) $2-\sqrt{2}$

Answer: (D) $2-\sqrt{2}$ · Key from source paper

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Q196 AIEEE 2012 · 26 May · Online MCQ

The line parallel to x-axis and passing through the point of intersection of lines $ax + 2by + 3b = 0$ and $bx - 2ay - 3a = 0$, where $(a, b) \neq (0, 0)$ is

(A) above x-axis at a distance $2/3$ from it
(B) above x-axis at a distance $3/2$ from it
(C) below x-axis at a distance $3/2$ from it
(D) below x-axis at a distance $2/3$ from it

Answer: (C) below x-axis at a distance $3/2$ from it · Key from source paper

Q197 AIEEE 2012 · 26 May · Online MCQ

Consider the straight lines
$L_1 : x - y = 1$
$L_2 : x + y = 1$
$L_3 : 2x + 2y = 5$
$L_4 : 2x - 2y = 7$
The correct statement is

(A) $L_1 \parallel L_4, L_2 \parallel L_3, L_1$ intersect L_4.
(B) $L_1 \perp L_2, L_1 \parallel L_3, L_1$ intersect L_2.
(C) $L_1 \perp L_2, L_2 \parallel L_3, L_1$ intersect L_4.
(D) $L_1 \perp L_2, L_1 \perp L_3, L_2$ intersect L_4.

Answer: (D) $L_1 \perp L_2, L_1 \perp L_3, L_2$ intersect L_4. · Key from source paper

Q198 AIEEE 2012 · 19 May · Online MCQ

If three distinct points A, B, C are given in the 2dimensional coordinate plane such that the ratio of the distance of each one of them from the point $(1, 0)$ to the distance from $(-1, 0)$ is equal to $\frac{1}{2}$, then the circumcentre of the triangle ABC is at the point

(A) $\left(\frac{5}{3}, 0\right)$
(B) $(0, 0)$
(C) $\left(\frac{1}{3}, 0\right)$
(D) $(3, 0)$

Answer: (A) $\left(\frac{5}{3}, 0\right)$ · Key from source paper

Q199 AIEEE 2012 · 12 May · Online MCQ

If the point $(1, a)$ lies between the straight lines $x + y = 1$ and $2(x + y) = 3$ then a lies in interval

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(A) $\left(\frac{3}{2}, \infty\right)$
(B) $\left(1, \frac{3}{2}\right)$
(C) $(-\infty, 0)$
(D) $\left(0, \frac{1}{2}\right)$

Answer: (D) $\left(0, \frac{1}{2}\right)$ · Key from source paper

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Q200

AIEEE 2012 · 12 May · Online · MCQ

If two vertices of a triangle are $(5, -1)$ and $(-2, 3)$ and its orthocentre is at $(0, 0)$, then the third vertex is

(A) $(4, -7)$
(B) $(-4, -7)$
(C) $(-4, 7)$
(D) $(4, 7)$

Answer: (B) $(-4, -7)$ · Key from source paper

Q201

AIEEE 2012 · 7 May · Online · MCQ

If the straight lines $x + 3y = 4, 3x + y = 4$ and $x + y = 0$ form a triangle, then the triangle is

(A) scalene
(B) equilateral triangle
(C) isosceles
(D) right angled isosceles

Answer: (C) isosceles · Key from source paper

Q202

AIEEE 2012 · 7 May · Online · MCQ

The point of intersection of the lines $(a^3 + 3)x + ay + a - 3 = 0$ and $(a^5 + 2)x + (a + 2)y + 2a + 3 = 0$ (a real) lies on the y-axis for

(A) no value of a
(B) more than two values of a
(C) exactly one value of a
(D) exactly two values of a

Answer: (A) no value of a · Key from source paper

Q203 AIEEE 2012 · Offline MCQ

If the line $2x + y = k$ passes through the point which divides the line segment joining the points $(1, 1)$ and $(2, 4)$ in the ratio $3 : 2$, then k equals

(A) $\frac{29}{5}$
(B) 5
(C) 6
(D) $\frac{11}{5}$

Answer: (C) 6 · Key from source paper

Q204 AIEEE 2011 MCQ

The lines $L_1 : y - x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q respectively. The bisector of the acute angle between L_1 and L_2 intersect L_3 at R. This question has Statement -1 and Statement -2. Of the four choices given after the statements, choose the one that best describes the two statements. Statement-1 : The ratio $PR : RQ$ equals $2\sqrt{2} : \sqrt{5}$. Statement-2 : In any triangle, bisector of an angle divides the triangle into two similar triangles.

(A) Statement -1 is true, Statement -2 is true; Statement -2 is not a correct explanation for Statement -1
(B) Statement -1 is true, Statement- 2 is false.
(C) Statement -1 is false, Statement- 2 is true.
(D) Statement -1 is true, Statement -2 is true; Statement -2 is a correct explanation for Statement -1

Answer: (B) Statement -1 is true, Statement- 2 is false. · Key from source paper

Q205 AIEEE 2010 MCQ

The line L given by $\frac{x}{5} + \frac{y}{b} = 1$ passes through the point $(13, 32)$. The line K is parallel to L and has the equation $\frac{x}{c} + \frac{y}{3} = 1$. Then the distance between L and K is

(A) $\sqrt{17}$
(B) $\frac{17}{\sqrt{15}}$
(C) $\frac{23}{\sqrt{17}}$
(D) $\frac{23}{\sqrt{15}}$

Answer: (C) $\frac{23}{\sqrt{17}}$ · Key from source paper

Q206 AIEEE 2009 MCQ

The lines $p\left(p^2 + 1\right)x - y + q = 0$ and $\left(p^2 + 1\right)^2 x + \left(p^2 + 1\right)y + 2q = 0$ are perpendicular to a common line for

(A) no value of p
(B) exactly one value of p
(C) exactly two values of p
(D) more than two values of p

Answer: (B) exactly one value of p · Key from source paper

Q207 AIEEE 2009 MCQ

Three distinct points A, B and C are given in the 2 - dimensional coordinate plane such that the ratio of the distance of any one of them from the point $(1,0)$ to the distance from the point $(-1,0)$ is equal to $\frac{1}{3}$. Then the circumcentre of the triangle ABC is at the point

(A) $(0,0)$
(B) $\left(\frac{5}{4},0\right)$
(C) $\left(\frac{5}{2},0\right)$
(D) $\left(\frac{5}{3},0\right)$

Answer: (B) $\left(\frac{5}{4},0\right)$ · Key from source paper

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Q208 AIEEE 2008 MCQ

The perpendicular bisector of the line segment joining $P(1,4)$ and $Q(k,3)$ has y-intercept - 4. Then a possible value of k is

(A) 1
(B) 2
(C) -2
(D) -4

Answer: (D) -4 · Key from source paper

Q209 AIEEE 2007 MCQ

Let $A(h,k)$, $B(1,1)$ and $C(2,1)$ be the vertices of a right angled triangle with AC as its hypotenuse. If the area of the triangle is 1, then the set of values which ' k ' can take is given by

(A) $\{1,3\}$
(B) $\{0,2\}$
(C) $\{-1,3\}$
(D) $\{-3,-2\}$

Answer: (C) $\{-1,3\}$ · Key from source paper

Q210 AIEEE 2007 MCQ

Let $P=(-1,0), Q=(0,0)$ and $R=(3,3\sqrt{3})$ be three points. The equation of the bisector of the angle PQR

(A) $\sqrt{3}x + y = 0$
(B) $x + \frac{\sqrt{3}}{2}y = 0$
(C) $\frac{\sqrt{3}}{2}x + y = 0$
(D) $x + \sqrt{3}y = 0$

Answer: (A) $\sqrt{3}x + y = 0$ · Key from source paper

Q211 AIEEE 2007 MCQ

If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is

(A) $-1/2$
(B) -2
(C) 1
(D) 2

Answer: (C) 1 · Key from source paper

Q212 AIEEE 2006 MCQ

A straight line through the point A(3, 4) is such that its intercept between the axes is bisected at A. Its equation is

(A) $x + y = 7$
(B) $3x - 4y + 7 = 0$
(C) $4x + 3y = 24$
(D) $3x + 4y = 25$

Answer: (C) $4x + 3y = 24$ · Key from source paper

Q213 AIEEE 2006 MCQ

If (a, a^2) falls inside the angle made by the lines $y = \frac{x}{2}$, $x > 0$ and $y = 3x$, $x > 0$, then a belongs to

(A) $\left(0, \frac{1}{2}\right)$
(B) $(3, \infty)$
(C) $\left(\frac{1}{2}, 3\right)$
(D) $\left(-3, -\frac{1}{2}\right)$

Answer: (C) $\left(\frac{1}{2}, 3\right)$ · Key from source paper

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Q214 AIEEE 2005 MCQ

If non-zero numbers a, b, c are in H.P., then the straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point. That point is

(A) $(-1, 2)$
(B) $(-1, -2)$
(C) $(1, -2)$
(D) $(1, -\frac{1}{2})$

Answer: (C) $(1, -2)$ · Key from source paper

Q215 AIEEE 2005 MCQ

If a vertex of a triangle is $(1, 1)$ and the mid-points of two sides through this vertex are $(-1, 2)$ and $(3, 2)$, then the centroid of the triangle is

(A) $(-1, \frac{7}{3})$
(B) $(\frac{-1}{3}, \frac{7}{3})$
(C) $(1, \frac{7}{3})$
(D) $(\frac{1}{3}, \frac{7}{3})$

Answer: (C) $(1, \frac{7}{3})$ · Key from source paper

Q216 AIEEE 2005 MCQ

If the pair of lines $ax^2 + 2(a + b)xy + by^2 = 0$ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the area of another sector then

(A) $3a^2 - 10ab + 3b^2 = 0$
(B) $3a^2 - 2ab + 3b^2 = 0$
(C) $3a^2 + 10ab + 3b^2 = 0$
(D) $3a^2 + 2ab + 3b^2 = 0$

Answer: (D) $3a^2 + 2ab + 3b^2 = 0$ · Key from source paper

Q217 AIEEE 2005 MCQ

The line parallel to the x-axis and passing through the intersection of the lines $ax + 2by + 3b = 0$ and $bx - 2ay - 3a = 0$, where $(a, b) \neq (0, 0)$ is

(A) below the x-axis at a distance of $\frac{3}{2}$ from it
(B) below the x-axis at a distance of $\frac{2}{3}$ from it
(C) above the x-axis at a distance of $\frac{3}{2}$ from it
(D) above the x-axis at a distance of $\frac{2}{3}$ from it

Answer: (A) below the x-axis at a distance of $\frac{3}{2}$ from it · Key from source paper

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Q218 AIEEE 2004 MCQ

Let $A(2, -3)$ and $B(-2, 1)$ be vertices of a triangle ABC. If the centroid of this triangle moves on the line $2x + 3y = 1$, then the locus of the vertex C is the line

(A) $2x + 3y = 9$
(B) $2x - 3y = 7$
(C) $3x + 2y = 5$
(D) $3x - 2y = 3$

Answer: (A) $2x + 3y = 9$ · Key from source paper

Q219 AIEEE 2004 MCQ

The equation of the straight line passing through the point $(4, 3)$ and making intercepts on the co-ordinate axes whose sum is -1 is

(A) $\frac{x}{2} + \frac{y}{3} = -1$ and $\frac{x}{-2} + \frac{y}{1} = -1$
(B) $\frac{x}{2} - \frac{y}{3} = -1$ and $\frac{x}{-2} + \frac{y}{1} = -1$
(C) $\frac{x}{2} + \frac{y}{3} = 1$ and $\frac{x}{2} + \frac{y}{1} = 1$
(D) $\frac{x}{2} - \frac{y}{3} = 1$ and $\frac{x}{-2} + \frac{y}{1} = 1$

Answer: (D) $\frac{x}{2} - \frac{y}{3} = 1$ and $\frac{x}{-2} + \frac{y}{1} = 1$ · Key from source paper

Q220 AIEEE 2004 MCQ

If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals

(A) 1
(B) -1
(C) 3
(D) -3

Answer: (D) -3 · Key from source paper

Q221 AIEEE 2004 MCQ

If the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four times their product, then c has the value

(A) 1
(B) -1
(C) 2
(D) -2

Answer: (C) 2 · Key from source paper

Q222 AIEEE 2003 MCQ

A square of side a lies above the x-axis and has one vertex at the origin. The side passing through the origin makes an angle α $\left(0 < \alpha < \frac{\pi}{4}\right)$ with the positive direction of x-axis. The equation of its diagonal not passing through the origin is

(A) $y(\cos\alpha+\sin\alpha)+x(\cos\alpha-\sin\alpha)=a$
(B) $y(\cos\alpha-\sin\alpha)-x(\sin\alpha-\cos\alpha)=a$
(C) $y(\cos\alpha+\sin\alpha)+x(\sin\alpha-\cos\alpha)=a$
(D) $y(\cos\alpha+\sin\alpha)+x(\sin\alpha+\cos\alpha)=a$

Answer: (A) $y(\cos\alpha+\sin\alpha)+x(\cos\alpha-\sin\alpha)=a$ · Key from source paper

Q223 AIEEE 2003 MCQ

If the pair of straight lines $x^2-2pxy-y^2=0$ and $x^2-2qxy-y^2=0$ be such that each pair bisects the angle between the other pair, then

(A) $pq=-1$
(B) p = q
(C) $p=-q$
(D) $pq=1$

Answer: (A) $pq=-1$ · Key from source paper

Q224 AIEEE 2003 MCQ

Locus of a centriod of the triangle whose vertices are $(a\cos t, a\sin t)$, $(b\sin t, -b\cos t)$ and $(1,0)$, where t is a parameter, is

(A) $(3x+1)^2+(3y)^2=a^2-b^2$
(B) $(3x-1)^2+(3y)^2=a^2-b^2$
(C) $(3x-1)^2+(3y)^2=a^2+b^2$
(D) $(3x+1)^2+(3y)^2=a^2+b^2$

Answer: (C) $(3x-1)^2+(3y)^2=a^2+b^2$ · Key from source paper

Q225 AIEEE 2003 MCQ

If the equation of the locus of a point equidistant from the points (a_1,b_1) and (a_2,b_2) is $(a_1-a_2)x+(b_1-b_2)y+c=0$, then the value of 'c' is

(A) $\sqrt{a_1^2+b_1^2-a_2^2-b_2^2}$
(B) $\frac{1}{2}\left(a_2^2+b_2^2-a_1^2-b_1^2\right)$
(C) $a_1^2-a_2^2+b_1^2-b_2^2$
(D) $\frac{1}{2}\left(a_1^2+a_2^2+b_1^2+b_2^2\right)$

Answer: (B) $\frac{1}{2}\left(a_2^2+b_2^2-a_1^2-b_1^2\right)$ · Key from source paper

Q226 AIEEE 2002 MCQ

A triangle with vertices (4, 0), (-1, -1), (3, 5) is

(A) isosceles and right angled
(B) isosceles but not right angled
(C) right angled but not isosceles
(D) neither right angled nor isoceles

Answer: (A) isosceles and right angled · Key from source paper

Q227 AIEEE 2002 MCQ

If the pair of lines $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ intersect on the y - axis then

(A) $2fgh = bg^2 + ch^2$
(B) $\mathrm{bg}^2 \neq \mathrm{ch}^2$
(C) $abc = 2fgh$
(D) none of these

Answer: (A) $2fgh = bg^2 + ch^2$ · Key from source paper

Q228 AIEEE 2002 MCQ

The point of lines represented by $3ax^2 + 5xy + (a^2 - 2)y^2 = 0$ and perpendicular to each other for

(A) two values of a
(B) $\forall a$
(C) for one value of a
(D) for no values of a

Answer: (A) two values of a · Key from source paper

Q229 AIEEE 2002 MCQ

Locus of mid point of the portion between the axes of $x\cos\alpha + y\sin\alpha = p$ where p is constant is

(A) $x^2 + y^2 = \frac{4}{p^2}$
(B) $x^2 + y^2 = 4p^2$
(C) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{2}{p^2}$
(D) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{4}{p^2}$

Answer: (D) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{4}{p^2}$ · Key from source paper

Q230 AIEEE 2002 MCQ

The equation of a circle with origin as a centre and passing through equilateral triangle whose median is of length 3a is

(A) $x^2 + y^2 = 9a^2$

(B) $x^2 + y^2 = 16a^2$

(C) $x^2 + y^2 = 4a^2$

(D) $x^2 + y^2 = a^2$

Answer: (C) $x^2 + y^2 = 4a^2$ · Key from source paper

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