POINT

LEVEL-1

Question based on **Distance Formula and its Applications**

Q.1 The distance of the point (3, 4) from origin is -
(A) 4 (B) 3
(C) 5 (D) 7

Q.2 The coordinates of a point are (0, 1) and the ordinate of another point is –3. If the distance between the two points is 5 then the abscissa of another point is -
(A) –3 (B) 3
(C) ± 3 (D) 1

Q.3 The points (0, –1); (2, 1); (0, 3) and (–2, 1) are vertices of a -
(A) Rectangle
(B) Square
(C) Rhombus
(D) Parallelogram

Q.4 The triangle with vertices (1, 5); (– 3, 1) and (3, – 5) is -
(A) isosceles (B) equilateral
(C) right angled (D) None of these

Q.5 The quadrilateral formed by the points (a,–b), (0,0), (– a, b) and (ab, $-b^2$) is -
(A) rectangle (B) parallelogram
(C) square (D) None of these

Q.6 If the points (1, 1) (–1, –1) and ($-\sqrt{3}$, k) are vertices of an equilateral triangle then the value of k will be -
(A) –1 (B) 1
(C) $\sqrt{3}$ (D) $-\sqrt{3}$

Q.7 If vertices of a triangle are (0, 4), (4, 1) and (7, 5), then its perimeter is -
(A) $5(\sqrt{2}+\sqrt{5})$ (B) $2\sqrt{2}$
(C) $5(2+\sqrt{2})$ (D) $2\sqrt{5}$

Q.8 If the points (4, –4), (–4, 4) and (x, y) form an equilateral triangle, then -
(A) $x = -4\sqrt{3}$, $y = 4\sqrt{3}$
(B) $x = 4\sqrt{3}$, $y = -4\sqrt{3}$
(C) $x = 4\sqrt{3}$, $y = 4\sqrt{3}$
(D) None of these

Q.9 If P, Q, R are collinear points such that P(7, 7), Q(3, 4) and PR = 10, then R is -
(A) (1, 1) (B) (1, –1)
(C) (–1, 1) (D) (–1, –1)

Question based on **Section Formula**

Q.10 If (3, – 4) and (– 6, 5) are the extremities of the diagonal of a parallelogram and (– 2, 1) is its third vertex, then its fourth vertex is -
(A) (– 1, 0) (B) (– 1, 1)
(C) (0, – 1) (D) None of these

Q.11 The coordinates of the point which divides the line segment joining (–3, –4) and (–8, 7) externally in the ratio 7:5 are -
(A) (41/2, 69/2) (B) (–41/2, –69/2)
(C) (–41/2, 69/2) (D) None of these

Q.12 The ratio in which the point (8, 4) divides the line segment joining the points (5, –2) and (9, 6) is -

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

Q.13 If x-axis divides the line joining (3, 4) and (5, 6) in the ratio $\lambda : 1$ then λ is -

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

Q.14 If the point dividing internally the line segment joining the points (a, b) and (5, 7) in the ratio 2 : 1 be (4, 6), then -

(A) a = 2, b = – 4 (B) a = 1, b = 2

(C) a = 2, b = 4 (D) a = –2, b = 4

Q.15 Coordinates of trisection of line joining points (–3, –3) and (6,6) is -

(A) (0, 0), (3, –3) (B) (0, 0), (3, 3)

(C) (1, 1), (3, 3) (D) (1, 1), (–3, 3)

Q.16 The ratio in which x-axis divides the join of the points (2, –3) and (5, 6) is -

(A) 2 : – 1 (B) 1 : 2

(C) 2 : 1 (D) None of these

Q.17 The line segment joining the points (3, 4) and (7, 8) is divided by the line $2x + 3y + 7 = 0$ in the ratio -

(A) 1/5 : 9 externally (B) 5 : 9 internally

(C) 5 : 1/9 externally (D) 5 : 9 externally

Q.18 If the middle point of the line segment joining the points (5, a) and (b, 7) be (3, 5), then (a, b) is -

(A) (3, 1) (B) (–2, –2)

(C) (1, 3) (D) (–3, –1)

Q.19 The point (5, –1) divides the line segment joining points A and B in the ratio 2 : 3. If A is (11, –3), then B will be -

(A) (4, –2) (B) (4, 2)

(C) (–4, 2) (D) (–4, –2)

Q.20 The line segment joining the points (–3, –4) and (1, 2) is divided by y-axis in the ratio -

(A) 2 : 3 (B) 1 : 3

(C) 3 : 1 (D) 3 : 2

Question based on Centres of the Triangle

Q.21 If two vertices joining the hypotenuse of a right angled triangle are (0, 0) and (3, 4), then the length of the median through the vertex having right angle is -

(A) 3 (B) 2 (C) 5/2 (D) 7/2

Q.22 The centroid of a triangle with vertices (2, 1); (5, 2) and (3, 4) is -

(A) (8/3, 7/3) (B) (10/3, 7/3)

(C) (–10/3, 7/3) (D) (10/3, –7/3)

Q.23 If the vertices of a triangle be (a, b–c), (b, c–a) and (c, a–b), then the centroid of the triangle lies -

(A) On y-axis (B) On x-axis

(C) At origin (D) None of these

Q.24 If (–4, 6) ,(2, 3) and (–2, –5) are vertices of a triangle, then its incentre is -

(A) (–1, 2) (B) (2, –1)

(C) (1, 2) (D) (2, 1)

Q.25 Circumcentre of a triangle whose vertex are (0,0), (4,0) and (0,6) is -

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

(C) (2, 3) (D) (4, 6)

Q.26 Orthocentre of a triangle whose vertex are (8,–2), (2,–2) and (8,6) is -

(A) (8, –2) (B) (8, 6)

(C) $\left(\frac{18}{3},\frac{2}{3}\right)$ (D) (0, 0)

Q.27 The distance of orthocentre of the triangle (2, 3), (4, 5) and (–1, 10) from (2, 3) is -

(A) $2\sqrt{2}$ (B) $\sqrt{2}$

(C) 4 (D) 2

Q.28 A triangle whose vertex are (2, 3), (4, 5) and (–2, 11), distance between circumcentre and vertex (4, 5) is -

(A) 2 (B) $4\sqrt{5}$

(C) $2\sqrt{5}$ (D) 4

Q.29 If A (4, –3); B (3, –2) and C(2, 8) are vertices of a triangle, then the distance of its centroid from y- axis is -
(A) 9/2 (B) 1
(C) 3 (D) 1/2

Q.30 If the vertices of a triangle be (0, 0), (6, 0) and (6, 8), then its incentre will be -
(A) (1, 2) (B) (2, 1)
(C) (4, 2) (D) (2, 4)

Q.31 The circumcentre of the triangle with vertices (0, 0); (3, 0) and (0, 4) is -
(A) (1, 1) (B) (2, 3/2)
(C) (3/2, 1) (D) None of these

Q.32 The distance of the centroid from the origin of the triangle formed by the points (1, 1), (0, –7) and (–4, 0) is -
(A) $\sqrt{2}$ (B) $\sqrt{4}$
(C) $\sqrt{3}$ (D) $\sqrt{5}$

Question based on Area and Collinear Points

Q.33 Area of the triangle with vertices (4, 4); (3, –2) and (3, –16) is -
(A) 7 (B) 18
(C) 15 (D) 27

Q.34 The Area of the triangle with vertices (1, 2); (5, 7) and (3, 8) is -
(A) 6 (B) 7
(C) 8 (D) 9

Q.35 If (5, –4) and (–3, 2) are two opposite vertices of a square then its area is -
(A) 50 (B) 75 (C) 25 (D) 100

Q.36 The area of a triangle with vertices (3, 8); (–4, 2) and (5,–1) is -
(A) 40.5 (B) 36.5
(C) 3.75 (D) 37.5

Q.37 For what value of k the points (k, 2 – 2k), (1 – k, 2k) and (– 4 – k, 6 – 2k) are collinear ?
(A) 1,–1/2 (B) 1,1/2
(C) –1,1/2 (D) –1,–1/2

Q.38 The condition that three points (a, 0), (0, b) and (1, 1) are collinear is -
(A) $\frac{1}{a}+\frac{1}{b}=2$ (B) $\frac{1}{a}+\frac{1}{b}=1$
(C) $\frac{1}{a}+\frac{1}{b}=0$ (D) $\frac{1}{a}=\frac{1}{b}$

Q.39 Opposite vertex of a square are (3, –4) and (–5, 2) then area of square is -
(A) 25 (B) 50
(C) 75 (D) 100

Q.40 The area of the triangle formed by the points (a, b + c), (b, c + a), (c, a + b) is -
(A) $a^2 + b^2 + c^2$ (B) abc
(C) ab + bc + ca (D) 0

Q.41 If D,E,F are mid points of the sides AB, BC and CA of a triangle formed by the points A(5, –1) B(–7, 6) and C (1, 3), then area of Δ DEF is-
(A) 2/5 (B) 5/2
(C) 5 (D) 10

Q.42 The area of a quadrilateral constructed by lines $|x| + |y| = 1$ is -
(A) 4 (B) 3 (C) 2 (D) 1

Question based on Reflection of a Point and Transformation of axes

Q.43 The reflection of the point (1,–2) with respect to y– axis is -
(A) (–1,–2) (B) (–1, 2)
(C) (1, 2) (D) None of these

Q.44 The image of (4, –5) in y axis is -
(A) (–4, –5) (B) (4, 5)
(C) (–4, 5) (D) None of these

Q.45 On shifting the origin to the point (2, –5) and keeping the axis parallel, the new coordinates of the point (–5, 3) will be -

(A) (7, –8) (B) (–3, –2)

(C) (–7, 8) (D) None of these

Q.46 If the axes are rotated through an angle of 30º in the anti-clockwise direction, the coordinates of points $(4,-2\sqrt{3})$ with respect to new axes are -

(A) $(2, \sqrt{3})$ (B) $(\sqrt{3}, -5)$

(C) (2, 3) (D) $(\sqrt{3}, 2)$

Question based on Locus

Q.47 If A(c, 0) and B(–c, 0) are two points, then the locus of a point P which moves such that $PA^2 + PB^2 = AB^2$ is -

(A) $x^2 - y^2 = c^2$ (B) $y^2 = 4cx$

(C) $x^2 + y^2 = c^2$ (D) None of these

Q.48 The locus of a point whose abscissa and ordinate are always equal, will be -

(A) x – y = 0 (B) x + y = 0

(C) x – y = 1 (D) x + y = 1

Q.49 Let A (2, 3) and B(–4, 5) are two fixed points. A point P moves in such a way that Δ PAB = 12 sq. units, then its locus is -

(A) $x^2 + 6xy + 9y^2 + 22x + 66y - 23 = 0$

(B) $x^2 + 6xy + 9y^2 + 22x + 66y + 23 = 0$

(C) $x^2 + 6xy + 9y^2 - 22x - 66y - 23 = 0$

(D) None of these

Q.50 If sum of square of distances of a point from axes is 4, then its locus is -

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

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

Q.51 The locus of a point, which moves in such a way that its distance from the origin (0, 0) is thrice the distance from x axis is -

(A) $x^2 - 8y^2 = 0$ (B) $4x^2 - y^2 = 0$

(C) $x^2 + 8y^2 = 0$ (D) $x^2 - 4y^2 = 0$

Q.52 The locus of the moving point P, such that 2PA = 3PB where A is (0, 0) and B is (4, –3), is

(A) $5x^2 + 5y^2 + 72x + 54y + 225 = 0$

(B) $5x^2 - 5y^2 + 72x + 54y + 225 = 0$

(C) $5x^2 - 5y^2 - 72x + 54y + 225 = 0$

(D) $5x^2 + 5y^2 - 72x + 54y + 225 = 0$

Q.53 If the distance of any point P from the point A (a + b, b – a) and B(a – b, a + b) are equal, then locus of P is -

(A) ax – by = 0 (B) bx – ay = 0

(C) bx + ay = 0 (D) ax + by = 0

LEVEL- 2

Q.1 The distance between feet of perpendiculars drawn from a point (–3, 4) on both axes is -

(A) 5 (B) 2

(C) 4 (D) 1

Q.2 P,Q and R three points on the line joining A(–6, 8) and B(8, –6) such that AP = PQ = QR = RB, then coordinates of R are -

(A) (–5/2, 9/2) (B) (5/2, 9/2)

(C) (5/2, –9/2) (D) (9/2, –5/2)

Q.3 The mid points of the sides of a triangle are (5,0), (5,12) and (0, 12) the orthocentre of this triangle is -

(A) (0, 0) (B) (0, 24)

(C) (10, 0) (D) $\left(\frac{13}{3},8\right)$

Q.4 The extremities of hypotenuse of a right-angled triangle are (2, 0) and (0, 2), then locus of its third vertex is -

(A) $x^2 + y^2 – 2x – 2y = 0$

(B) $x^2 + y^2 + 2x – 2y = 0$

(C) $x^2 + y^2 – 2x + 2y = 0$

(D) $x^2 + y^2 + 2x + 2y = 0$

Q.5 Line segment joining (5,0) and (10cosθ, 10sinθ) is divided by a point P in ratio 2 : 3 . If θ varies then locus of P is a -

(A) Pair of straight lines

(B) Circle

(C) Straight line

(D) Parabola

Q.6 The area common to triangle formed by (0,0), (0, 2p), (2q,0) and (0, 0) , (2q,0), (2q, 2p) is -

(A) 2pq (B) 4pq

(C) pq (D) pq/2

Q.7 A(–3, 4) and B(2, 1) be any two given points. If C be a point on AB produced such that AC = 2BC, then the coordinates of C are -

(A) (3, 7) (B) (2, 4)

(C) (7, –2) (D) (–1/2, –5/2)

Q.8 An equilateral triangle whose orthocentre is (3, –2), one side is on x- axis then vertex of triangle which is not on x- axis is -

(A) (3, –6) (B) (1, –2)

(C) (9, –2) (D) (3, –3)

Q.9 An equilateral triangle whose circumcentre is (–2, 5) one side is on y- axis then length of side of triangle is-

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

Q.10 Area of a triangle whose vertices are (a cosθ,b sinθ), (–a sinθ, b cosθ) and (–a cosθ, –b sinθ) is-

(A) absinθ cosθ (B) acosθ sinθ

(C) $\frac{1}{2}$ ab (D) ab

Q.11 A(3,4) and B(5, –2) are two given points. If PA = PB and area of ΔPAB = 10, then P is -

(A) (7, 1) (B) (7, 2)

(C) (–7, 2) (D) (–7, –1)

Q.12 A (6, 3); B (–3, 5) ; C(4, –2) and D(x, 3x) are four points. If the areas of Δ DBC and ΔABC are in the ratio 1:2, then x is equal to -

(A) 11/8 (B) 3

(C) 8/11 (D) None of these

Q.13 Without changing the direction of coordinates axes, to which point origin should be transferred so that the equation $x^2 + y^2 –4x + 6y –7 = 0$ is changed to an equation which contains no term of first degree -

(A) (3,2) (B) (2, –3)

(C) (–2, 3) (D) None of these

Q.14 If the line segment joining the points A(a, b) and B(c, d) subtends an angle θ at the origin, then cosθ is equal to –

(A) $\frac{ac-bc}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

(B) $\frac{ac+bd}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

(C) $\frac{ac+cd}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

(D) None of these

Q.15 Three points are A(6,3), B(–3,5), C(4, –2) and P(x,y) is a point, then the ratio of area of ΔPBC and ΔABC is -

(A) $\left|\frac{x+y-2}{7}\right|$ (B) $\left|\frac{x-y-2}{7}\right|$

(C) $\left|\frac{x-y+2}{2}\right|$ (D) None of these

Q.16 The area of an equilateral triangle whose two vertices are (1,0) and (3,0) and third vertex lying in the first quadrant is-

(A) $\sqrt{3}/4$ (B) $\sqrt{3}/2$

(C) $\sqrt{3}$ (D) None of these

Q.17 Reflecting the point (2, –1) about y -axis, coordinate axes are rotated at 45º angle in negative direction without shifting the origin. The new coordinates of the points are -

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

(C) $\left(-\frac{3}{\sqrt{2}},\frac{1}{\sqrt{2}}\right)$ (D) None of these

Q.18 Keeping coordinate axes parallel, the origin is shifted to a point (1, –2), then transformed equation of $x^2 + y^2 = 2$ is -

(A) $x^2 + y^2 + 2x - 4y + 3 = 0$

(B) $x^2 + y^2 + 2x + 4y + 3 = 0$

(C) $x^2 + y^2 - 2x - 4y + 3 = 0$

(D) $x^2 + y^2 - 2x + 4y + 3 = 0$

Q.19 To remove xy term from the second degree equation $5x^2 + 8xy + 5y^2 + 3x + 2y + 5 = 0$, the coordinates axes are rotated through an angle θ, then θ equals -

(A) π/2 (B) π/4

(C) 3π/8 (D) π/8

Q.20 The image of the point (–1, 3) in the line $x - y = 0$ is -

(A) (–1, –1) (B) (1, –3)

(C) (3, 3) (D) (3, –1)

Q.21 A(1,0) and B (–1, 0) are two points and Q is a point which satisfies the relation AQ – BQ = ± 1. The locus of Q is -

(A) $12x^2 - 4y^2 = 3$ (B) $12x^2 - 4y^2 + 3 = 0$

(C) $12x^2 + 4y^2 = 3$ (D) $12x^2 + 4y^2 + 3 = 0$

Q.22 If A(cosα, sinα), B (sinα, –cosα), C (1, 2) are the vertices of a ΔABC, then as α varies, the locus of its centroid is -

(A) $x^2 + y^2 - 2x - 4y + 3 = 0$

(B) $x^2 + y^2 - 2x - 4y + 1 = 0$

(C) $3(x^2 + y^2) - 2x - 4y + 1 = 0$

(D) None of these

Q.23 The point (4, 1) undergoes two successive transformations -

(i) Reflection about the line y = x

(ii) Translation through a distance 2 units along the positive direction of x axis

The final position of the point is given by the coordinates -

(A) (4, 3) (B) (3, 4)

(C) (7/2, 7/2) (D) (1, 4)

LEVEL- 3

Q.1 The x coordinate of the incentre of the triangle where the mid point of the sides are (0, 1), (1, 1) and (1, 0) is -

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

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

Q.2 OPQR is a square and M and N are the mid points of sides PQ and QR respectively then ratio of area of square and the triangle OMN is -

(A) 4 : 1 (B) 2 :1 (C) 8 : 3 (D) 4 : 3

Q.3 The points with co-ordinates (2a, 3a), (3b, 2b) and (c, c) are collinear -

(A) For no value of a,b,c

(B) For all values of a, b, c

(C) If a, c/5, b are in H.P

(D) If a, 2c/5, b are in H.P.

Q.4 The area of the quadrilateral formed by points $(a^2 + 2ab, b^2)$, $(a^2 + b^2, 2ab)$, $(a^2, b^2 + 2ab)$ and $(a^2 + b^2 - 2ab, 4ab)$ is-

(A) Zero (B) $(a + b)^2$

(C) $a^2 + b^2$ (D) $(a - b)^2$

Q.5 In the Δ ABC, the coordinates of B are (0, 0), AB = 2, $\angle$ ABC = $\pi/3$ and the middle point of BC has the coordinates (2, 0). The centroid of the triangle is -

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

(C) $\left(\frac{4+\sqrt{3}}{3}, \frac{1}{3}\right)$ (D) none of these

Q.6 Four points (x_1, y_1), (x_2, y_2), (x_3, y_3) and (x_4, y_4) are such that

$$\sum_{i=1}^{4}(x_i^2 + y_i^2) \le 2\,(x_1x_3 + x_2x_4 + y_1y_2 + y_3y_4)$$

Then these points are vertices of -

(A) Parallelogram (B) Rectangle

(C) Square (D) Rhombus

Q.7 (x_i, y_i) are vertices of a equilateral triangle ABC such that $(x_1 - 2)^2 + (y_1 - 3)^2 = (x_2 - 2)^2 + (y_2 - 3)^2 = (x_3 - 2)^2 + (y_3 - 3)^2$. Then $2(x_1 + x_2 + x_3) + 3(y_1 + y_2 + y_3) =$

(A) 30 (B) 29

(C) 39 (D) None of these

Q.8 The area of triangle formed by two rays whose combined equation is $y = |x|$ and the line $x + 2y = 2$ is -

(A) $\frac{8}{3}$ unit (B) $\frac{4}{3}$ unit

(C) 4 unit (D) $\frac{16}{3}$ unit

Q.9 A rod PQ of length 2a slides with its ends on the axes then locus of circumcentre of ΔOPQ is-

(A) $x^2 + y^2 = 2a^2$ (B) $x^2 + y^2 = 4a^2$

(C) $x^2 + y^2 = 3a^2$ (D) $x^2 + y^2 = a^2$

Questions based on Assertion and Reason

The following questions given below consist of an "Assertion" (1) and "Reason" (2) Type questions. **Use the following key to choose the appropriate answer.**

(A) Both (1) and (2) are true and (2) is the correct explanation of (1)

(B) Both (1) and (2) are true but (2) is not the correct explanation of (1)

(C) (1) is true but (2) is false

(D) (1) is false but (2) is true

Q.10 **Assertion (1) :** Area of triangle formed by the points A(20, 22), B(21, 24), C(22, 23) and area of the triangle formed by the points P(0, 0), Q(1, 2) and R(2, 1) are same.

Assertion (2) : The area of triangle be constant with respect to parallel transformation of co-ordinate axes.

Q.11 **Assertion (1) :** If the middle point of the sides of a triangle ABC are (0, 0), (1, 2) and (–3, 4) the centroid of the triangle ABC is $\left(\frac{-2}{3}, 3\right)$.

Assertion (2) : Centroid of a triangle ABC and centroid of the triangle formed by joining the mid points of sides of triangle ABC be always same.

Q.12 **Assertion (1) :** Orthocentre of a triangle whose vertices are (8, –2), (2, –2) and (8, 6) is (2, –2).
Assertion (2) : If a triangle is right angle triangle, then orthocentre is the point where right angle is formed.

Q.13 Centroid of a ΔABC is (1, 4). If two vertices are A(4, 3) and B(–9, 7) then
Assertion (1) : The third vertex C has coordinates (7, 8)
Assertion (2) : If vertices of triangle are (x_1, y_1), (x_2, y_2) and (x_3, y_3) then centroid is $\left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

Q.14 If x and y coordinate of a point are rational numbers then the point is called rational Point. Now
Assertion (1) : If vertices of a triangle are rational points then incentre is always rational point.
Assertion (2) : If $A(x_1, y_1)$ $B(x_2,y_2)$ and $C(x_3, y_3)$ are vertices of triangle ΔABC then incentre is
$\left(\frac{ax_1+bx_2+cx_3}{a+b+c}, \frac{ay_1+by_2+cy_3}{a+b+c}\right)$
where a = BC, b = AC, c = AB

Passage-1

$A(x_1, y_1)$ and $B(x_2, y_2)$ are two given points. $L \equiv ax + by + c = 0$ is any line. If L intersects AB at any point D, then $\frac{AD}{BD} = -\left(\frac{ax_1+by_1+c}{ax_2+by_2+c}\right)$.

Now if $\frac{AD}{BD} > 0$ then D divides AB internally and if $\frac{AD}{BD} < 0$ then D divides AB externally i.e. D lies on AB produced.

On the basis of the above passage, answer the following questions.

Q.15 The ratio in which line $3x – y = 9$ divides the line segment joining points (1, 3) and (2, 7)
(A) 9 : 10 externally (B) 9 : 10 internally
(C) 3 : 5 internally (D) 3 : 5 externally

Q.16 If the line segment joining (2, 3) and (–1, 2) is divided internally in the ratio 3 : 4 by the line $x + 2y = k$ then k =
(A) $\frac{41}{7}$ (B) $\frac{5}{7}$ (C) $\frac{36}{7}$ (D) $\frac{31}{7}$

Q.17 P, Q, R are the points of intersection of a line ℓ with sides BC, CA, AB of a ΔABC respectively, then $\frac{BP}{PC} \cdot \frac{CQ}{QA} \cdot \frac{AR}{RB} =$
(A) 1 (B) 2 (C) –1 (D) –2

Passage-2

Let origin O, (0, 0) be shifted to a point (a, b) by moving the x- axis and y- axis parallel to themselves. If the coordinates of a point P with reference to old axis are (x_1, y_1) then coordinate of this point with respect to new axis will be $(x_1 – a, y_1 – b)$.

On the basis of above information, answer the following questions

Q.18 If the axes are transformed from origin to the point (–2, 1), the new coordinates of (4, –5) are
(A) (2, 6) (B) (6, 4)
(C) (6, –6) (D) (2, –4)

Q.19 If the coordinates of point (4, 5) become (–3, 9) then the origin must be shifted at
(A) (7, –4) (B) (7, 4)
(C) (–7, 4) (D) None of these

Q.20 If origin is shifted at (2, –1) then new coordinates of point P are (5, –3) then its original coordinates were
(A) (7, –4) (B) (7, 4)
(C) (–7, 4) (D) None of these

Q.21 To which point origin must be shifted so that equation $y^2 + 4y + 8x – 2 = 0$ will not contain any term in y and the constant, then-
(A) $\left(\frac{3}{4}, 2\right)$ (B) $\left(\frac{3}{4}, -2\right)$
(C) $\left(-\frac{3}{4}, -2\right)$ (D) $\left(-\frac{3}{4}, 2\right)$

LEVEL- 4

(Question asked in previous AIEEE and IIT-JEE)

SECTION –A

Q.1 The points (– a, –b), (0, 0), (a, b) and (a^2, ab) are- **[AIEEE-2002]**

(A) collinear
(B) concyclic
(C) vertices of a rectangle
(D) vertices of a parallelogram

Q.2 The centroid of a triangle is (2, 3) and two of its vertices are (5, 6) and (– 1, 4). The third vertex of the triangle is- **[AIEEE-2002]**

(A) (2, 1) (B) (2, – 1)
(C) (1, 2) (D) (1, – 2)

Q.3 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 - **[AIEEE-2003]**

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

Q.4 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 **[AIEEE 2004]**

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

Q.5 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 - **[AIEEE-2005]**

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

Q.6 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 **[AIEEE 2007]**

(A) {1, 3} (B) {0, 2}
(C) {–1, 3} (D) {–3, –2}

Q.7 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 - **[AIEEE 2009]**

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

Q.8 If A(2, – 3) and B(–2, 1) are two vertices of a triangle and third vertex moves on the line $2x + 3y = 9$, then the locus of the centroid of the triangle is - **[AIEEE 2011]**

(A) $x – y = 1$ (B) $2x + 3y = 1$
(C) $2x + 3y = 3$ (D) $2x – 3y = 1$

SECTION –B

Q.1 If the sum of the distances of a point from two perpendicular lines in a plane is 1, then its locus is **[IIT-1992]**

(A) square
(B) circle
(C) straight line
(D) two intersecting lines

Q.2 If P (1, 0), Q (–1, 0) and R (2, 0) are three given points, then the locus of S satisfying the relation $SQ^2 + SR^2 = 2SP^2$ is **[IIT 1993]**

(A) a straight line || to x-axis

(B) a circle thro' the origin

(C) a circle with centre at the origin

(D) a straight line || to y-axis

Q.3 The orthocentre of the triangle with vertices $\left[2, \frac{(\sqrt{3}-1)}{2}\right]$, $\left(\frac{1}{2}, -\frac{1}{2}\right)$ and $\left(2, -\frac{1}{2}\right)$ is- **[IIT(s) 1993]**

(A) $\left[\frac{3}{2}, \frac{\sqrt{3}-3}{6}\right]$ (B) $\left[2, -\frac{1}{2}\right]$

(C) $\left[\frac{5}{4}, -\frac{\sqrt{3}-2}{4}\right]$ (D) $\left[\frac{1}{2}, -\frac{1}{2}\right]$

Q.4 If P (1, 2), Q (4, 6) R (5, 7) and S(a, b) are the vertices of a parallelogram PQRS, then **[IIT 1998]**

(A) a = b, b = 4 (B) a = 3, b = 4

(C) a = 2, b = 3 (D) a = 3, b = 5

Q.5 If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in G.P. with the same common ratio, then the points (x_1, y_1), (x_2, y_2) and (x_3, y_3) **[IIT-1999]**

(A) lie on a straight line

(B) lie on an ellipse

(C) lie on a circle

(D) are vertices of a triangle

Q.6 The incentre of the triangle with vertices $(1, \sqrt{3})$, (0, 0) and (2, 0) is **[IIT 2000]**

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

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

Q.7 Let O (0, 0), P(3, 4), Q (6, 0) be the vertices of the triangle OPQ. The point R inside the triangle OPQ is such that the triangles OPR, PQR, OQR are of equal area. The coordinates of R are **[IIT-2007]**

(A) $\left(\frac{4}{3}, 3\right)$ (B) $\left(3, \frac{2}{3}\right)$

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

ANSWER KEY

LEVEL- 1

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	C	C	B	C	D	C	C	C	C	A	C	B	B	C	B	B	D	A	C	C
Q.No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	C	B	B	A	C	A	A	C	C	C	D	D	A	B	A	D	C	B	B	D
Q.No.	41	42	43	44	45	46	47	48	49	50	51	52	53							
Ans.	B	C	A	A	C	B	C	A	C	D	A	D	B							

LEVEL- 2

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	A	D	A	A	B	C	C	A	C	D	B	A	B	B	A	C	A	A	B	D
Q.No.	21	22	23																	
Ans.	A	C	B																	

LEVEL- 3

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Ans.	C	C	D	A	B	B	C	B	D	A	D	D	D	D	A	A	C
Q.No.	18	19	20	21													
Ans.	C	A	A	B													

LEVEL- 4

SECTION-A

Q.No.	1	2	3	4	5	6	7	8
Ans.	A	B	D	A	C	C	A	D

SECTION-B

Q.No.	1	2	3	4	5	6	7
Ans.	A	D	B	C	A	D	C