MATHEMATICS

COORDINATE GEOMETRY

1. The join of (–3, 2) and (4, 6) is cut by x-axis in the ratio

(A) 2 : 3 internally

(B) 1 : 2 externally

(C) 1 : 3 externally

(D) 3 : 2 internally

SOL : $\frac{0}{1} = \frac{6m + 2n}{m + n}$

$\Rightarrow$ 6m + 2n = 0

$\Rightarrow \quad \frac{m}{n} = -\frac{1}{3}$

ANS : C

2. Find the distance between the pair of points, (a sin a, –b cos a) and (–a cos a, b sin a).

(A) $\sqrt{2}\sqrt{a^2 + b^2}\left|\cos\left(\alpha - \frac{\pi}{4}\right)\right|$

(B) $\sqrt{2}\sqrt{a^2 + b^2}\left|\cos\left(\alpha + \frac{\pi}{4}\right)\right|$

(C) $\sqrt{2}\sqrt{a^2 + b^2}\left|\sin\left(\alpha - \frac{\pi}{4}\right)\right|$

(D) $\sqrt{a^2 + b^2}\left|\cos\left(\alpha - \frac{\pi}{4}\right)\right|$

SOL : $(a\sin\alpha, -\cos\alpha)(-a\cos\alpha, b\sin\alpha)$

$\sqrt{(a\sin\alpha + a\cos\alpha)^2 + (-b\cos\alpha - b\sin\alpha)^2}$

$= \sqrt{a^2\sin^2\alpha + a^2\cos^2\alpha + 2a^2\sin\alpha\cos\alpha + b^2\cos^2\alpha + b^2\sin^2\alpha + 2b^2\sin\alpha\cos\alpha}$

$= \sqrt{(a^2 + b^2) + (a^2 + b^2)\sin\alpha}$

$= \sqrt{a^2 + b^2}\,|\sin\alpha + \cos\alpha|$

$= \sqrt{2}\sqrt{a^2 + b^2}\left|\cos\left(\alpha - \frac{\pi}{4}\right)\right|$

ANS : A

3. The ratio in which the line segment joining (2, –3) and (5, 6) is divided by (i) x-axis (ii) y-axis is

(A) 1 : 2 (internal), 2 : 5 (external) (B) 1 : 2 (internal), 2 : 5 (internal)

(C) 1 : 2 (external), 2 : 5 (internal) (D) 1 : 2 (external), 2 : 5 (external)

SOL : $0 = \frac{6m - 3n}{m + n} \Rightarrow \quad 6m - 3n = 0 \Rightarrow \quad \frac{m}{n} = \frac{3}{6} = \frac{1}{2}$

$0 = \frac{5m + 2n}{m + n} \Rightarrow 5m = -2n \Rightarrow \quad \frac{m}{n} = -\frac{2}{5}$

ANS : A

4. The points (–2, –5), (2, –2), (8, a) are collinear, then the value of a is

(A) $-\frac{5}{2}$ (B) $\frac{5}{2}$

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

SOL : since the given points (–2, –5), (2, –2), (8, a) are collinear.

$\therefore \quad \frac{1}{2}\begin{vmatrix} -2 & -5 \\ 2 & -2 \\ 8 & a \\ -2 & -5 \end{vmatrix} = 0$

$\Rightarrow \quad 4 + 10 + 21 + 16 - 40 + 2a = 0$

$\Rightarrow \quad 4a - 10 = 0 \Rightarrow a = \frac{5}{2}$

Hence (B) is the correct answer.

ANS : B

5. The area of the triangle with vertices at the points (a, b + c), (b, c + a), (c, a + b) is

(A) 0 (B) a + b + c

(C) ab + bc + ca (D) $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$

ANS : A

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

(A) a = 2, b = 4 (B) a = 3, b = 4

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

ANS : C

7. The medians of a triangle meet at (0, –3) and two vertices are at (–1, 4) and (5, 2). Then the third vertex is at

(A) (4, 15) (B) (–4, –15)

(C) (–4, 15) (D) (4, –15)

ANS : B

8. The area of the triangle with vertices at (–4, 1), (1, 2), (4, –3) is

(A) 17 (B) 16

(C) 15 (D) 14

SOL : Use area formula for triangle.

ANS : B

9. The ratio in which the x-axis divides internally the line segment joining (2, –3) and (3, 5) is

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

(C) 3 : 5 (D) 5 : 7

SOL : $0 = \frac{5m - 3n}{m + n} \Rightarrow 5m = 3n$

ANS : C

10. The value of k if the point P(–1, 2) is equidistant from the points A(2, k) and B(k, –1) is

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

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

SOL : $\Rightarrow \frac{m}{n} = \frac{3}{5}$

$\sqrt{9+(k-2)^2} = \sqrt{(k+1)^2+9}$ also k – 2 = – k – 1

$\Rightarrow$ k – 2 = ± (k + 1) 2k = 1

k – 2 = k + 1 $k = \frac{1}{2}$

$\Rightarrow$ –2 = 1 contraction.

ANS : B

11. If (2, 2p + 2) is the mid-point of (3p, 4) and (–2, 2q), the value of p and q are

(A) 2, 4 (B) 3, 6

(C) 7, 9 (D) 8, 10

SOL : $\frac{3p-2}{2} = 2$ $\frac{4+2q}{2} = 2p+2$

$\Rightarrow$ 3p – 2 = 4

$\Rightarrow$ p = 2

$\Rightarrow$ $\frac{4+2q}{2} = 6$

$\Rightarrow$ 2q = 8

q = 4

ANS : A

12. The co-ordinates of mid points of the sides of a triangle are (4, 2), (3, 3) and (2, 2). Then the coordinate of the centroids of the triangle are

(A) $\left(3, \frac{7}{3}\right)$ (B) (3, 3)

(C) (4, 3) (D) (1, 2)

ANS : A

13. The ratio in which the line x + 2y – 4 = 0 divides the join of (–1, 3) and (3, –1) is

(A) 1 : 2 (B) 1 : 4

(C) 1 : 3 (D) 1 : 5

ANS : D

14. The centroid of the triangle whose vertices are given in this question (4, –8), (–9, 7), (8, 13) is

(A) (0, 4) (B) (1, 4)

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

SOL : Let G(x, y) be the centroid of the triangle whose vertices are (4, –8), (–9, 7) and (8, 13).

$$\therefore \quad x = \frac{x_1 + x_2 + x_3}{3} = \frac{4 - 9 + 8}{3} = 1$$

$$y = \frac{y_1 + y_2 + y_3}{3} = \frac{-8 + 7 + 13}{3} = 4$$

$\therefore$ Centroid of the triangle is (1, 4).

ANS : B

15. Which point on y-axis is equidistant from (2, 3) and (–4, 1) ?

(A) (0, 4) (B) (0, –1)

(C) (0, 0) (D) (0, 5)

SOL : Let point on y-axis is Q(0, k), P(2, 3) and R(–4, 1), QP = QR.

$$\sqrt{(2-0)^2 + (k-3)^2} = \sqrt{(-4-0)^2 + (k-1)^2}$$

k = –1

So Ans. is (0, –1)

ANS : B

16. The points (-a, -b), (0, 0), (a, b) and (a^2, ab) are

(A) Collinear (B) Vertices of a parallelogram

(C) Vertices of a rectangle (D) None of these

ANS : A

17. If the points (5, 1), (1, p) & (4, 2) are collinear then the value of p will be

(A) 1 (B) 5 (C) 2 (D) -2

ANS : B

18. Length of the median from B on AC where A(-1, 3), B(1, -1), (5, 1) is

(A) $\sqrt{18}$ (B) $\sqrt{10}$ (C) $2\sqrt{3}$ (D) 4

ANS : B

19. The points (0, -1), (-2, 3), (6, 7) and (8, 3) are -

(A) Collinear (B) Vertices of a parallelogram which is not a rectangle

(C) Verticals of a rectangle, which is not a square (D) None of these

ANS : C

20. If (3, -4) and (-6, 5) are the extremities of the diagonal of a parallelogram and (-2, 1) is third vertex, then its fourth vertex is -

(A) (-1, 0) (B) (0, -1) (C) (-1, 1) (D) None of these

ANS : A

21. The distance between the points (a, b) and (-a, - b) is :

(A) $a^2 + b^2$ (B) $\sqrt{a^2 + b^2}$ (C) 0 (D) $2\sqrt{a^2 + b^2}$

ANS : D

22. The distance between points (a + b, b + c) and (a – b, c - b) is :

(A) $2\sqrt{a^2 + b^2}$ (B) $2\sqrt{a^2 + c^2}$ (C) $2.\sqrt{2b}$ (D) $\sqrt{a^2 - c^2}$

ANS : C

23. The distance between points A(1, 3) and B(x, 7) is 5. The value of x > 0 is :

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

ANS : A

24. The distance between the points (a cos 20^0 + b sin 20^0,0) and (a sin 20^0 - b cos 20^0) is :

(A) (a + b) (B) (a – b) (C) $\sqrt{a^2 - b^2}$ (D) $\sqrt{a^2 + b^2}$

ANS : C

25. Mid-point of the line-segment joining the points (-5, 4) and (9, - 8) is :

(A) (–7, 6) (B) (2, – 2) (C) (7, – 6) (D) (–2, 2).

ANS : B

26. The co-ordinates of the points which divides the join of (–2, 2) and (–5, 7) in the ratio 2 : 1 is :

(A) (4, – 4) (B) (–3, 1) (C) (–4, 4) (D) (1, –3).

ANS : C

27. The co-ordinates of the points on x-axis which is equidistant from the points (5, 4) and (–2, 3) are :

(A) (2, 0) (B) (3, 0) (C) (0, 2) (D) (0, 3).

ANS : A

28. The co-ordinates of the points on y-axis which is equidistant from the points (3, 1) and (1, 5) are

(A) (0, 4) (B) (0, 2) (C) (4, 0) (D) (2, 0).

ANS : B

29. The coordinates of the centre of a circle are (– 6, 1.5). If the ends of a diameter are (– 3, y) and (x, - 2) then:

(A) x = - 9, y = 5 (B) x = 5, y = - 9 (C) x = 9, y = 5 (D) None of these

ANS : A

30. The points (- 2, 2), (8, - 2) and (-4, - 3) are the vertices of a :

(A) equilateral Δ (B) isosceles Δ (C) right Δ (D) None of these

ANS : C

31. The points (1, 7), (4, 2) (- 1, 1) (- 4, 4) are the vertices of a :

(A) parallelogram (B) rhombus (C) rectangle (D) square.

ANS : D

32. The line segment joining (2, - 3) and (5, 6) is divided by x-axis in the ratio:

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

ANS : A

33. The line segment joining the points (3, 5) and (- 4, 2) is divided by y-axis in the ratio:

(A) 5 : 3 (B) 3 : 5 (C) 4 : 3 (D) 3 : 4.

ANS : D

34. If (3, 2), (4, k) and (5, 3) are collinear then k is equal to :

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

ANS : C

35. If the points (p, 0), (0, q) and (1, 1) are collinear then $\frac{1}{p}+\frac{1}{q}$ is equal to :

(A) – 1 (B) 1 (C) 2 (D) 0

ANS : C

36. Two vertices of a triangle are (-2, -3) and (4, -1) and centroid is at the origin. The coordinates of the third vertex of the triangle are :

(A) (– 2, 3) (B) (–3, – 2) (C) (–2, 4) (D) (4, –2)

ANS : C

37. A (5, 1), B(1, 5) and C(–3, –1) are the vertices of Δ ABC. The length of its median AD is :

(A) $\sqrt{34}$ (B) $\sqrt{35}$ (C) $\sqrt{37}$ (D) 6

ANS: C

38. Three consecutive vertices of a parallelogram are (1, –2), (3, 6) and (5, 10). The coordinates of the fourth vertex are :

(A) (–3, 2) (B) (2,– 3) (C) (3, 2) (D) (– 2, –3)

ANS : C

39. The vertices of a parallelogram are (3, –2), (4, 0), (6,– 3) and (5,– 5). The diagonals intersect at the point M. The coordinates of the point M are :

(A) $\left(\frac{9}{2},\frac{5}{2}\right)$ (B) $\left(\frac{7}{2},\frac{5}{2}\right)$ (C) $\left(\frac{7}{2},\frac{3}{2}\right)$ (D) None of these

ANS : A

40. If two vertices of a parallelogram are (3, 2) and (–1, 0) and the diagonals intersect at (2, –5), then the other two vertex are :

(A) (1,– 10), (5, –12) (B) (1,– 12), (5, –10) (C) (2, – 10) (D) (1, – 10), (2, – 12)

ANS : B

41. The circumcentre of the triangle formed by the lines xy + 2x + 2y + 4 = 0 and x + y + 2 = 0 is :

(A) (– 1, – 2) (B) (– 1, – 1) (C) (– 2, – 2) (D) (0, 0)

ANS : B

42. The vertices of a triangle (a, b – c), (b, c – a) and (c, a – b), then it's centroid lies on :

(A) y-axis (B) x-axis (C) x = 0 (D) None of these

ANS : B

43. The points (1, 2), (3, 8) and (x, 20) are collinear if x =

(A) 4 (B) 5 (C) 6 (D) 7

ANS : D

44. For the triangle whose sides are along the lines x = 0 , y = 0 and $\frac{x}{6}+\frac{y}{8}=1$, the incentre is :

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

ANS: C

45. For the triangle whose sides are along the lines y = 15 , 3x – 4y = 0, 5x + 12y = 0, the incentre is :

(A) (1, 8) (B) (– 1, 8) (C) (8, 1) (D) None of these

ANS : C

46. The points D(2, 1), E(–1, –2) and F(3, 3) are the mid points of sides BC, CA and AB respectively of a Δ ABC. The vertices A, B and C are :

(A) (0, 0), (6, 6), (– 2, – 4) (B) (0, 1), (6, 6), (2, 4)

(C) (1, 0), (3, 3), (– 2, – 4) (D) None of these

ANS : A

47. The number of integral values of m, for which x-coordinate of the point of intersection of the lines 3x + 4y = 9 and y = mx + 1 is also an integer, is :

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

ANS : A

48. The radius of the circle inscribed in the triangle formed by lines x = 0, y = 0, 4x + 3y – 24 = 0 is :

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

ANS : B

49. In a Δ ABC, if A is the point (1, 2) and equations of the median through B and C are respectively x + y = 5 and x = 4, then B is :

(A) (1, 4) (B) (7, – 2) (C) (4, 1) (D) (– 2, 7)

ANS : B

50. The straight line 3x + y = 9 divides the segment joining the points (1, 3) and (2, 7) in the ratio :

(A) 4 : 3 (B) 3 : 4 (C) 4 : 5 (D) 5 : 6

ANS : B

51. Two opposite vertices of a rectangle are (1, 3) and (5, 1). If the equation of a diagonal this rectangle is y = 2x + c, then the value of c is :

(A) – 4 (B) 1 (C) – 9 (D) None of these

ANS : A

52. The radius of the circle passing through the point (6, 2) two of whose diameters are x + y = 6 and x + 2y = 4 is :

(A) 10 (B) $2\sqrt{5}$ (C) 6 (D) 4

ANS : B

53. The straight lines x + y = 0, 3x + y – 4 = 0, x + 3y – 4 = 0 form a triangle which is :

(A) Isosceles (B) Equilateral (C) Right angled (D) None of these

ANS : A

54. The lines segment joining the points (1, 2) and (–2, 1) is divided by the line 3x + 4y = 7 in the ratio :

(A) 3 : 4 (B) 4 : 3 (C) 9 : 4 (D) 4 : 9

ANS : D

55. If a, b, c are in A. P. then the straight line ax + by + c = 0 will always pass through a fixed point whose co-ordinates are :

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

ANS : A

56. The lines 8x + 4y = 1, 8x + 4y = 5, 4x + 8y = 3, 4x + 8y = 7 from a :

(A) Rhombus (B) Rectangle (C) Square (D) None of these

ANS : A

57. The incentre of the triangle formed by the lines y = 15, 12y = 5x and 3x + 4y = 0 is :

(A) (8, 1) (B) (– 1, 8) (C) (1, 8) (D) None of these

ANS : C

58. The area of triangle formed by the lines y = x, y = 2x and y = 3x + 4 is :

(A) 4 (B) 7 (C) 9 (D) 8

ANS : A

59. The triangle formed by the lines x + y = 1, 2x + 3y – 6 = 0 and 4x – y + 4 = 0 lies in the :

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

ANS : B

60. A line is drawn through the points (3, 4) and (5, 6). If the line is extended to a point whose ordinate is – 1, then the abscissa of that point is ;

(A) 0 (B) – 2 (C) 1 (D) 2

ANS : B

61. The area of the triangle whose sides are along the lines x = 0, y = 0 and 4x + 5y = 20 is :

(A) 20 (B) 10 (C) $\frac{1}{10}$ (D) $\frac{1}{20}$

ANS : B

62. If a, b, c are all distend, then the equations (b – c) x + (c – a) y + a – b = 0 and ($b^3 - c^3$) x + ($c^3 - a^3$) y + $a^3 - b^3$ = 0 represent the same line if :

(A) a + b + c $\neq$ 0 (B) a + b c = 0

(C) a + b = 0 or b + c = 0 (D) None of these

ANS : B

63. The area of the quadrilateral with vertices at (4, 3), (2, – 1), (– 1, 2), (– 3, – 2) is :

(A) 18 (B) 36 (C) 54 (D) None of these

ANS : A

64. If α, β, γ are the real roots of the equation $x^3 - 3px^2 - 1 = 0$, then the centroid of the triangle with vertices $\left(\alpha \frac{1}{\alpha}\right), \left(\beta \frac{1}{\beta}\right)$ and $\left(\gamma \frac{1}{\gamma}\right)$ is at the point :

(A) (p, q) (B) (p/3, q/3) (C) (p + q, p – q) (D) (3p, 3q)

ANS : A

65. The co-ordinates of A, B C are (6, 3), (– 3, 5), (4, – 2) respectively and P is any point (x , y). the ratio of the areas of Δ ABC and Δ ABC is :

(A) $\left|\frac{x-y-2}{7}\right|$ (B) $\left|\frac{x+y-2}{7}\right|$ (C) $\left|\frac{x+y+2}{7}\right|$ (D) None of these

ANS : B

66. The area of a triangle is 5 square units. Two of its vertices are (2, 1) and (3, – 2). The third vertex lie on y = x + 3, the third vertex is :

(A) $\left(\frac{7}{2}, \frac{13}{2}\right) or \left(\frac{-3}{2}, \frac{3}{2}\right)$ (B) $\left(\frac{7}{2}, \frac{-13}{2}\right) or \left(\frac{-3}{2}, \frac{3}{2}\right)$

(C) $\left(\frac{7}{2}, \frac{13}{2}\right) or \left(\frac{3}{2}, \frac{3}{2}\right)$ (D) None of these

ANS : A

67. The point of intersection of the lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$, lies on the line :

(A) x – y = 0 (B) $x+y=\frac{2ab}{a+b}$ (C) $x-y\frac{2ab}{a+b}$ (D) Both (A) and (B)

ANS : D

68. The point A divides the join of the points (–5, 1) and (3, 5) in the ratio k : 1 and co-ordinates of points B and C are (1, 5) and (7, – 2) respectively. If the area of Δ ABC be 2 units, then k equals :

(A) 7, 9 (B) 6, 7 (C) $7,\frac{31}{9}$ (D) $9,\frac{31}{9}$

ANS : C

69. Q, R and S are the points on the line joining the points P(a, x) and T(b, y) such that PQ = QR = RS = ST, then $\left(\frac{5a+3b}{8},\frac{5x+3y}{8}\right)$ is the mid point of the segment :

(A) PQ (B) QR (C) RS (D) ST

ANS : B

70. The triangle with vertices A(2, 7), B(4, y) and C(–2, 6) is right angled at A if :

(A) y = – 1 (B) y = 0 (C) y = 1 (D) None of these

ANS : A

71. The co-ordinates with of the point which divides the line segment joining (– 3, – 4) and (– 8, 7) externally in the ratio 7 : 5 are :

(A) $\left(\frac{41}{2},\frac{69}{2}\right)$ (B) $\left(\frac{-41}{2},\frac{-69}{2}\right)$ (C) $\left(\frac{-41}{2},\frac{69}{2}\right)$ (D) None of these

ANS : C

72. The distance of the centroid from the orign of the friangle formed by the points (1, 1), (0, – 7) and (– 4, 0) is :

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

ANS : D

73. If A(4, – 3), B(3, – 2) and C(2, 8) are vertices of a triangle, then the distance of it's centroid from the y-axis is :

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

ANS : C

74. If (5, – 4) and (– 3, 2) are two opposite vertices of a square, then it's area is :

(A) 50 (B) 75 (C) 25 (D) 100

ANS : A

75. A(6, 3), B(–3, 5), C(4, – 2) and (x, 3x) are four points. If the areas of ΔDBC and ΔABC are in the ratio 1 : 2, then x is equal to :

(A) $\frac{11}{8}$ (B) 3 (C) $\frac{8}{11}$ (D) None of these

ANS : A

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

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

ANS : C

77. 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)

ANS : A

79. Point P divides the line segment joining A(– 5, 1) and B(3, 5) internally in the ratio λ : 1. If Q = (1, 5), R = (7, – 2) and area of ΔPQR = 2, then λ equals :

(A) 23 (B) $\frac{29}{5}$ (C) $\frac{31}{9}$ (D) None of these

ANS : C

80. 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) $\frac{\sqrt{3}}{4}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\sqrt{3}$ (D) None of these

ANS : C

81. ABC is an isosceles triangle. If the co-ordinates of the base are B(1, 3) and C(–2, 7), the co-ordinates of vertex A is

(A) $\left(\frac{-1}{2},5\right)$ (B) (1, 6) (C) $\left(\frac{5}{6},6\right)$ (D) None of these

ANS : C

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

(a2 + b2 – 2ab, 4ab) is :

(A) Zero (B) $(a + b)^2$ (C) $a^2 + b^2$ (D) $(a – b)^2$

ANS : A

83. The lines ax + 2y + 1 = 0, bx + 3y + 1 = 0 and cx + 4y + 1 = 0 are concurrent, then :

(A) a, b, c are in A.P. (B) a, b, c are in G.p. (C) a, b, c are in H.P. (D) None of these

ANS : A

84. If the lines x + 2ay + a = 0, x + 3by + b = 0 and x 4cy + c = 0 are concurrent, then a, b, c are in (abc $\neq 0$) :

(A) A.P. (B) G.P. (C) H.P. (D) None of these

ANS : C

85. If (0, β) lies on or inside the triangle formed by the lines 3x + y + 2 = 0, 3y – 2x – 5 = 0 and 4y + x – 14 = 0 then :

(A) $\frac{5}{2} \le \beta \le \frac{7}{3}$ (B) $\frac{5}{3} \le \beta \le \frac{7}{2}$ (C) $\frac{7}{3} \le \beta \le \frac{5}{2}$ (D) None of these

ANS : B

86. If a, x_1, x_2 are in G.P. with common ratio r1 and b, y_1, y_2 are in G.P. with common ratio s where s – r = 2, then the area of the triangle with vertices (a, b), (x_1, y_1) and (x_2, y_2) is :

(A) $\left| ab(r^2 - 1) \right|$ (B) ab ($r^2 - s^2$) (C) ab ($s^2 - 1$) (D) abrs

ANS : A

87. If the circumcentre of a triangle lies at the origin and the centroid is the middle point of the line joining the points ($a^2 + 1$, $a^2 + 1$) and (2a, – 2a), then the co-ordinates of the orthocenter are :

(A) $\left[\frac{(a+1)^2}{4}, \frac{(a-1)^2}{4} \right]$ (B) $\left[\frac{3}{4}(a+1)^2, \frac{3}{4}(a-1)^2 \right]$

(C) ($3(a + 1)^2$, $3 (a – 1)^2$) (D) None of these

ANS : D

88. If every point on the line ($a_1 – a_2$) x + ($b_1 – b_2$) y = c is equidistant from the points (a_1, b_1) and (a_2 , b_2) then 2c =

(A) $a_1^2 - b_1^2 + a_2^2 + b_2^2$ (B) $a_1^2 + b_1^2 + a_2^2 + b_2^2$ (C) $a_1^2 - b_1^2 - a_2^2 - b_2^2$ (D) None of these

ANS : C

89. A rectangle has two opposite vertices at the points (1, 2) and (5, 5). If the other vertices lie on the line x = 3, the co-ordinates of the vertex nearer the axis of x are :

(A) 3, 1 (B) (3, 2) (C) (3, 4) (D) (3, 6)

ANS : A

90. If the area of the triangle formed by the pair of lines $8x^2 – 6y^2 + y^2 = 0$ and the line 2x + 3y = a is 7, then a is equal

(A) 14 (B) $14\sqrt{2}$ (C) 28 (D) None of these

ANS : C

91. If the centroid of the triangle formed by the pair of lines $2y^2 + 5xy – 3x^2 = 0$ and x + y = k is $\left(\frac{1}{18}, \frac{11}{18} \right)$, then the value of k is :

(A) – 1 (B) 0 (C) 1 (D) None of these

ANS : C

92. If x_1, x_2, x_3 are the abscissa of the points A_1, A_2, A_3 respectively where the lines $y = m_1 x$, $y = m_2 x$, $y = m_3 x$ meet the line $2x - y + 3 = 0$ such that m_1, m_2, m_3, are in A.P., then x_1, x_2, x_3 are in :

(A) A.P. (B) G.P. (C) H.P. (D) None of these

ANS : C

93. The area of the triangle with vertices $\left(1, \frac{\pi}{8}\right), \left(1, \frac{5\pi}{8}\right)$ and $\left(\sqrt{2}\frac{3\pi}{8}\right)$ is :

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

ANS : B

94. An equilateral triangle whose orthocenter 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)

ANS : A

95. If O is the origin and the co-ordinates of A and B are (x_1, y_1) and (x_2, y_2) respectively then OA $\times$ OB cos $\angle$ AOB is equal to :

(A) $x_1y_1 + x_2y_2$ (B) $x_1x_2 + y_1y_2$ (C) $x_1y_2 + x_2y_1$ (D) $x_1x_2 - y_1y_2$

ANS : B

96. If the vertices of a triangle have integral co-ordinates, then the triangle is :

(A) Isosceles (B) Never equilateral (C) Equilateral (D) None of these

ANS : B

97. The circumcentre of the triangle formed by the points (a cos α , a sin α), (a cos β , sin β), (a cos γ , sin γ) is

(A) (0, 0)

(B) $\left[\left(\frac{a}{3}\right)(\cos\alpha + \cos\beta + \cos\gamma), \left(\frac{a}{3}\right)(\sin\alpha + \sin\beta + \sin\gamma)\right]$

(C) (a, 0) (D) None of these

ANS : A

98. The x co-ordinates 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) $1+\sqrt{2}$

ANS : C

99. OPQR is a square and M and N are the mid points of the 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

ANS : C

100. The point with co-ordinates (2a, 3a), (3b, 2b) and (c, c) are collinear :

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

(C) If a, $\frac{c}{5}$, b are in H.P. (D) If a, $\frac{2c}{5}$, b are in H.P.

ANS : D