1. A straight line through (4, –3) cuts the axes such that intercepts are equal in magnitude, then its equation is
(a) $x – y + 1 = 0$ (b) $x + y + 1 = 0$ (c) $x + y = 7$ (d*) $x – y = 7$

2. The locus of the mid–point of the portion intercepted between the axes by the line $x \cos \alpha + y \sin \alpha = p$, where p is constant, is
(a) $x^2 + y^2 = 4p^2$ (b*) $1/x^2 + 1/y^2 = 4/p^2$
(c) $x^2 + y^2 = 4/p^2$ (d) $1/x^2 + 1/y^2 = 2/p^2$.

3. The line L has intercepts a and b on the coordinate axes. When, keeping the origin fixed, the coordinate axes are rotated through a fixed angle, then the same line has intercepts p and q on the rotated axes. Then
(a*) $a^2 + b^2 = p^2 + q^2$ (b) $1/a^2 + 1/b^2 = 1/p^2 + 1/q^2$
(c) $a^2 + p^2 = b^2 + q^2$ (d) $1/a^2 + 1/p^2 = 1/b^2 + 1/q^2$

4. A line passes through (2, 2) and is perpendicular to the line $3x + y = 3$. Its y intercept is
(a) 1/3 (b) 2/3 (c) 1 (d*) 4/3

5. The distance between the parallel lines $y = 2x + 4$ and $6x = 3y + 5$ is
(a) $17/\sqrt{3}$ (b) 1 (c) $3/\sqrt{5}$ (d*) $17\sqrt{5}/15$

6. The distance between the parallel lines $3x + 4y = 9$ and $6x + 8y = 15$ is
(a) 3/2 (b*) 3/10 (c) 6 (d) None of these

7. Let PQR be a right angled isosceles triangle, right angled at P(2, 1). If the equation of the line QR is $2x + y = 3$, then the equation representing the pair of lines PQ and PR is
(a) $3x^2 – 3y^2 + 8xy + 20x + 10y + 25 = 0$ (b*) $3x^2 – 3y^2 + 8xy – 20x – 10y + 25 = 0$
(c) $3x^2 – 3y^2 + 8xy + 10x + 15y + 20 = 0$ (d) $3x^2 – 3y^2 – 8xy – 10x – 15y – 20 = 0$

8. The line $3x + 4y – 24 = 0$ cuts the x–axis at A and y–axis at B. Then the in–centre of the ΔOAB where O is the origin is
(a) (1, 2) (b*) (2, 2) (c) (12, 12) (d) (2, 12)

9. The orthocentre of the triangle with vertices $\{2, (\sqrt{3} – 1)/2\}$, (1/2, – 1/2) and (2, – 1/2) is
(a) $[3/2, (\sqrt{3} – 3)/6]$ (b*) (2, – 1/2)
(c) $[5/4, (\sqrt{3} – 2)/4]$ (d) (1/2, – 1/2)

10. The orthocentre of the triangle formed by the line $xy = 0$ and $x + y = 1$ is
(a) (1/2, 1/2) (b) (1/3, 1/3) (c*) (0, 0) (d) (1/4, 1/4)

11. Orthocentre of the triangle whose sides are given by $4x – 7y + 10 = 0$, $x + y – 5 = 0$ and $7x + 4y – 15 = 0$ is
(a) (– 1, – 2) (b) (1, – 2) (c) (– 1, 2) (d*) (1, 2)

12. The points (k – 1, k + 2), (k, k + 1), (k + 1, k) are collinear for
(a) any value of k (b) k = – 1/2 only
(c) no value of k (d) integral values of k only

13. The area of the triangle formed by the points (k ,2 – 2k), (– k + 1, 2k) and (– 4 – k, 6 – 2k) is 70 units. For
(a) four real values of k (b) no integral value of k
(c) two integral values of k (d) only one integral value of k

14. The triangle with vertices A(2, 7), B(4, y) and C(– 2, 6) is right angled if
(a) y = – 1 (b) y = 0 (c) y = 1 (d) none of these

15. The join of the points (– 3, – 4) and (1, – 2) is divided by y–axis in the ratio
(a) 1 : 3 (b) 2 : 3 (c) 3 : 1 (d) 3 : 2

16. The points P(a, b + c), Q(b, c + a) and R(c, a + b) are such that PQ = QR if
(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

17. The points A(2, 3); B(3, 5), C(7, 7) and D(4, 5) are such that
(a) A B C D is a parallelogram (b) A, B, C, D are collinear
(c) D lies inside the triangle ABC (d) D lies on the boundary of the triangle ABC

18. P and Q are points on the line joining the points A(25, 37) and B(55, – 17) such that AP = PQ = QB, then the mid point of PQ is
(a) (30, 20) (b) (30, 54) (c) (40, 10) (d) (15, 10)

19. If (0, 1), (1, 1) and (1, 0) are the mid points of the sides of a triangle, the coordinates of its incentre are
(a) $(2+\sqrt{2}\ ,\ 2+\sqrt{2})$ (b) $((2+\sqrt{2}), -(2+\sqrt{2}))$
(c) $(2-\sqrt{2}\ ,\ 2-\sqrt{2})$ (d) $((2-\sqrt{2}\ , -(2-\sqrt{2}))$

20. A(6, 3), B(– 3, 5), C(4, – 2) and D(x, 3x) are four points. If $\Delta DBC; \Delta ABC = 1 : 2$, then x is equal to
(a) 11/8 (b) 8/11 (c) 3 (d) none of these

21. The centroid of a triangle lies at the origin and the coordinates of its two vertices are (– 8, 7) and (9, 4). The area of the triangle is
(a) 95/6 (b) 285/2 (c) 190/3 (d) 285

22. If the vertices of a triangle ABC are A(– 4, – 1), B(1, 2) and C(4, – 3), then coordinates of the circumcentre of the triangle are
(a) (1/3, – 2/3) (b) (0, – 4) (c) (0, – 2) (d) (– 3/2, 1/2)

23. The vertices of the triangle ABC are A(1, 2), B(3, 4) and C(2, 3), then the greatest angle of the triangle is
(a) 75° (b) 105° (c) 120° (d) 135°

24. The points (0, 8/3), (1, 3) and (82, 30) are the vertices of
(a) obtuse angled triangle (b) acute angled triangle
(c) right angled triangle (d) none of these

25. The extremities of a diagonal of a parallelogram are the points (3, – 4) and (– 6, 5). If third vertex is (– 2, 1) then the coordinates of the fourth vertex are

(a) (1, 0) (b) (– 1, 0) (c) (1, 1) (d) none of these

26. The orthocentre of the triangle formed by (0, 0), (8, 0) and (4, 6) is

(a) (4, 8/3) (b) (3, 4) (c) (4, 2) (d) (– 3, 4)

27. The lines $(p + 2q)\,x + (p – 3q)\,y = p – q$ for different values of p and q pass through the fixed point

(a) (3/2, 5/2) (b) (2/5, 2/5) (c) (3/5, 3/5) (d) (2/5, 3/5)

28. If the vertices of a triangle are (0, 0), (a, 0) and $(a/2, \sqrt{3}a/2)$, the coordinates of the incentre of the triangle are

(a) $(a/3.\ a/2\sqrt{3})$ (b) $(a/2.\ a\sqrt{3}/6)$ (c) $(a/6,\ a\sqrt{3}/2)$ (d) $(3a/4.\ \sqrt{3a}/4)$

29. Let ABCD be a square in which A lies on the positive y–axis and B lies on the positive x–axis. If D is the point (12, 17), the coordinates of C are,

(a) (17, 12) (b) (17, 5) (c) (14, 16) (d) (15, 3)

30. ABCD is a rhombus. Its diagonals AC and BD intersect at the point M and satisfy BD = 2AC. If the coordinates of D and M are (1, 1) and (2, – 1) respectively, the coordinates of A are

(a) (– 3, – 1/2) (b) (1, – 3/2) (c) (3/2, – 1) (d) (1/2, – 3)