

- The point (4, 1) undergoes the following three transformations successively
 - Reflection about the line $y = x$
 - Transformation through a distance 2 units along the positive direction of the x -axis
 - Rotation through an angle $\pi/4$ about the origin in the anti clockwise direction.
- The final position of the point is given by the co-ordinates
 - $\left(\frac{4}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$
 - $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$
 - $\left(\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$
 - $\left(\frac{3}{\sqrt{2}}, \frac{4}{\sqrt{2}}\right)$
- The three lines $4x - 7y + 10 = 0$, $x + y = 5$ and $7x + 4y = 15$ form the sides of a triangle. Then the point (1, 2) is its
 - centroid
 - incentre
 - orthocentre
 - none of these
- If $(-6, -4)$ and $(3, 5)$ are the extremities of the diagonal of a parallelogram and $(-2, 1)$ is its third vertex, then its fourth vertex is
 - $(-1, 0)$
 - $(0, -1)$
 - $(-1, 1)$
 - none of these
- P (3, 1), Q (6, 5) and R (x, y) are three points such that the angle PRQ is a right angle and the area of $\Delta RPQ = 7$. Then the number of such points R is
 - 0
 - 1
 - 2
 - infinity
- The three lines $3x + 4y + 6 = 0$, $\sqrt{2}x + \sqrt{3}y + 2\sqrt{2} = 0$ and $4x + 7y + 8 = 0$ are
 - the sides of a triangle
 - concurrent
 - parallel
 - none of these
- If $P = (1, 0)$, $Q = (-1, 0)$, $R = (2, 0)$ are 3 given points, then the locus of the point S satisfying the relation $SQ^2 + SR^2 = 2SP^2$ is
 - a straight line parallel to the x -axis
 - circle through the origin
 - circle with centre at the origin
 - a straight line parallel to the y -axis
- The area enclosed by $|x| + |y| = 1$ is
 - 1
 - 2
 - 3
 - 4
- Let the vertices of a triangle be $(0, 0)$, $(3, 0)$ and $(0, 4)$. Its orthocentre is
 - $(0, 0)$
 - $(1, 4/3)$
 - $(3/2, 2)$
 - none of these
- The points $(-a, -b)$, $(0, 0)$, (a, b) and (a^2, ab) are
 - collinear
 - vertices of a parallelogram
 - vertices of a rectangle
 - none of these
- A ray of light coming from the point (1, 2) is reflected at a point A on the x -axis and then passes through the point (5, 3). The coordinates of the point A are
 - $\left(\frac{13}{7}, 0\right)$
 - $\left(\frac{5}{12}, 10\right)$
 - $(-7, 0)$
 - none of these
- If $A(\cos \alpha, \sin \alpha)$, $B(\sin \alpha - \cos \alpha)$, $C(2, 1)$ are the vertices of a ΔABC , then as α varies the locus of its centroid is
 - $x^2 + y^2 - 2x - 4y + 1 = 0$
 - $3(x^2 + y^2) - 2x - 4y + 1 = 0$
 - $x^2 + y^2 - 2x - 4y + 3 = 0$
 - none of these
- The co-ordinates of those points on the line $3x + 2y = 5$ which are equidistant from the lines $4x + 3y - 7 = 0$ and $2y - 5 = 0$ are
 - $\left(-\frac{1}{14}, \frac{73}{28}\right)$
 - $\left(\frac{11}{16}, \frac{47}{32}\right)$
 - $\left(\frac{1}{14}, \frac{67}{28}\right)$
 - $\left(\frac{1}{16}, \frac{77}{32}\right)$
- In a rhombus ABCD, the diagonals AC and BD intersect at the point (1, 2). If the point B is (2, 3), the diagonal AC has equation

- (a) $x + y = 0$ (b) $x - y = 3$ (c) $x - y = 0$ (d) $x + y = 3$
15. If $3a + 2b + 6c = 0$, the family of lines $ax + by + c = 0$ passes through a fixed point whose coordinates are given by
 (a) $\left(\frac{1}{2}, \frac{1}{3}\right)$ (b) $(2, 3)$ (c) $(3, 2)$ (d) $\left(\frac{1}{3}, \frac{1}{2}\right)$
16. Area of the parallelogram whose sides are $x \cos \alpha + y \sin \alpha = p$, $x \cos \alpha + y \sin \alpha = q$, $x \cos \beta + y \sin \beta = r$, $x \cos \beta + y \sin \beta = s$ is
 (a) $pq + rs$ (b) $|pq \tan \alpha + rs \tan \beta|$
 (c) $|(p - q)(r - s) \operatorname{cosec}(\alpha - \beta)|$ (d) $|(p - q)(r - s) \tan(\alpha + \beta)|$
17. If ΔOAB is an equilateral triangle (O is the origin and A is a point on the x-axis), then centroid of the triangle will be
 (a) always rational (b) rational if B is rational
 (c) rational if A is rational (d) never rational
18. If one vertex of an equilateral triangle is at $(1, 2)$ and the base is $x + y - 2 = 0$, then the length of each of the side is
 (a) $\sqrt{\frac{3}{2}}$ (b) $\sqrt{\frac{2}{3}}$ (c) $\frac{2}{3}$ (d) $\frac{3}{2}$
19. The equations of the lines through $(-1, -1)$ and making angle 45° with the line $x + y = 0$ are given by
 (a) $x^2 - xy + x - y = 0$ (b) $xy - y^2 + x - y = 0$
 (c) $xy + x + y = 0$ (d) $xy + x + y + 1 = 0$
20. The equations to a pair of opposite sides of a parallelogram are $x^2 - 5x + 6 = 0$ and $y^2 - 6y + 5 = 0$. The equations to its diagonals are
 (a) $x + 4y = 13$ and $y = 4x - 7$ (b) $4x + y = 13$ and $4y = x - 7$
 (c) $4x + y = 13$ and $y = 4x - 7$ (d) $y - 4x = 13$ and $y + 4x = 7$
21. The locus of a point P which divides the line joining $(1, 0)$ and $(2 \cos \theta, 2 \sin \theta)$ internally in the ratio $1 : 2$ for all θ , is
 (a) straight line (b) circle (c) pair of straight line (d) parabola
22. If $u = a_1x + b_1y + c_1 = 0$ and $v = a_2x + b_2y + c_2 = 0$ and $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, then $u + kv = 0$ represents
 (a) a family of concurrent lines (b) a family of parallel lines
 (c) $u = 0$ (d) $v = 0$
23. Points on the line $x + y = 4$ that lie at a unit distance from the line $4x + 3y - 10 = 0$ are
 (a) $(3, 1)$ and $(-7, 11)$ (b) $(-3, 7)$ and $(2, 2)$
 (c) $(-3, 7)$ and $(-7, 11)$ (d) none of these
24. The algebraic sum of the perpendicular distances from $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ to a variable line is zero. Then the line passes through
 (a) the orthocentre of ΔABC (b) centroid of ΔABC
 (c) incentre of ΔABC (d) circumcentre of ΔABC
25. If the two pairs of lines $x^2 - 2mxy - y^2 = 0$ and $x^2 - 2nxy - y^2 = 0$ are such that one of them represents the bisector of the angles between the other, then
 (a) $mn + 1 = 0$ (b) $mn - 1 = 0$
 (c) $\frac{1}{m} + \frac{1}{nb} = 0$ (d) $\frac{1}{m} - \frac{1}{n} = 0$

26. The line $(p + 2q)x + (p - 3q)y = p - q$, for different values of p and q , passes through the fixed point
 (a) $\left(\frac{3}{2}, \frac{5}{2}\right)$ (b) $\left(\frac{2}{5}, \frac{2}{5}\right)$ (c) $\left(\frac{3}{5}, \frac{3}{5}\right)$ (d) $\left(\frac{2}{5}, \frac{3}{5}\right)$
27. The lines $2x + y - 1 = 0$, $ax + 3y - 3 = 0$ & $3x + 2y - 2 = 0$ are concurrent for
 (a) all a (b) $a = 4$ only (c) $-1 \leq a \leq 3$ (d) $a > 0$ only
28. If the line $y = mx$ meets the lines $x + 2y - 1 = 0$ and $2x - y + 3 = 0$ at the same point, then m is equal to
 (a) 1 (b) -1 (c) 2 (d) -2
29. The pair of straight lines perpendicular to the pair of the lines $ax^2 + 2hxy + by^2 = 0$ has the equation
 (a) $ax^2 - 2hxy + by^2 = 0$ (b) $ay^2 + 2hxy + bx^2 = 0$
 (c) $bx^2 + 2hxy + ay^2 = 0$ (d) $bx^2 - 2hxy + ay^2 = 0$
30. A straight line through $P(1, 2)$ is such that its intercept between the axes is bisected at P . Its equation is
 (a) $x + 2y = 5$ (b) $x - y + 1 = 0$ (c) $x + y - 3 = 0$ (d) $2x + y - 4 = 0$

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