Straight lines and Pair of Straight Lines

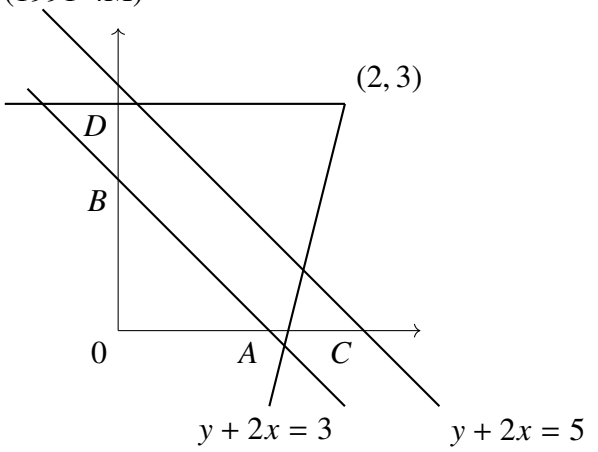
Golla Shriram - AI24BTech11010

I. E - Subjective Problems

4) (1979)
   a) Two vertices of triangle are $(5,-1)$ and $(2,-3)$.If the orthocentre of triangle is origin, find the coordinates of the thrid point.
   b) Find the equation of the line which bisects the obtuse angle between the lines $x-2y+4=0$ and $4x-3y+2=0$.
5) A stright line L is perpendicular to the line $5x-y+1$.The area of the triangle formed by L and the coordinate axes is 5 . Find the equation of the line L. (1980)
6) The end A,B of a straight line segment of constant lenght c slide upon the fixed rectangle OX, OY respectively.then show that the locus of the foot of perpendicular drawn from P to AB is

$$x^{\frac{2}{3}}+y^{\frac{2}{3}}=c^{\frac{2}{3}}$$

7) The vertices of a triangle are $[at_1t_2, a(t_1+t_2)]$, $[at_2t_3, a(t_2+t_3)]$, $[at_3t_1, a(t_3+t_1)]$. Find the orthocentre of the triangle. (1983-3M)
8) The coordinates of A, B, C are $[6,3]$, $[3,5]$, $[4,2]$ respectively, and P is any point (x,y). Show that the ratio of the area of triangles ΔPBC and ΔABC is $\left|\frac{x+y-2}{7}\right|$ (1983-2M)
9) Two equal sides of an isosceles triangle are given by the equations $7x-y+3=0$ and $x+y-3=0$ and its third side passes through the point $(1,-10)$. Determine the equation of the third side. (1985-3M)
10) One of the diameters of the circle circumscribing the rectangle $ABCD$ is $4y=x+7$. if A and B are the points $(-3,4)$ and $(5,4)$ respectively, the find the area of rectangle . (1985-3M)
11) Two sides of a rhombus $ABCD$ are parallel to the lines $y=x+2$ and $y=7x+3$ .If the diagonals of the rhombus intersect at the point $(1,2)$ and the vertex A is on the y-axis , find the possible co-ordinates of A. (1985-5M)
12) Lines $L_1 \equiv ax+by+c=0$ and $L_2 \equiv lx+my+n=0$ intersect at the point P and make an angle θ with each other . Find the equation of a line L different from L_2 which passes through P and make same angle θ with L_1 . (1988-5M)
13) Let ABC be the triangle $AB=AC$. If D is the midpoint of BC, E is the foot of the perpendicular drawn from D to AC and F the mid-point of DE , prove that AF is perpendicular to BE. (1989-5M)
14) Straight lines $3x+4y=5$ and $4x-3y=15$ intersect at the point A . Points B and C are chosen on these two lines such that $AB=AC$ .Determine the possible equations of the line BC passing through the point $(1,2)$.(1990-4M)
15) A line cuts the x-axis at $A(7,0)$ and the y-axis at $B(0,-5)$. A variable line PQ is drawn perpendicular to AB cutting the x-axis in P and the y-axis in Q. If AQ and BP intersect at R, find the locus of R. (1990-4M)
16) Find the equation of the line passing through the point $(2,3)$ and making intercept of length 2 units between the lines $y+2x=3$ and $y+2x=5$. (1991-4M)



17) Show that all chords of the curve $3x^2-y^2-2x+4y=0$, which subtend a right angle at the origin.pass through a fixed point . Find the coordinates of point. (1991-4M)
18) Determine all values of α for which the point (α, α^2) lies inside the triangle formed by the

lines. (1992-6M)

$$2x + 3y - 1 = 0$$
$$x + 2y - 3 = 0$$
$$5x - 6y - 1 = 0$$