# Straight lines and Pair of Straight Lines

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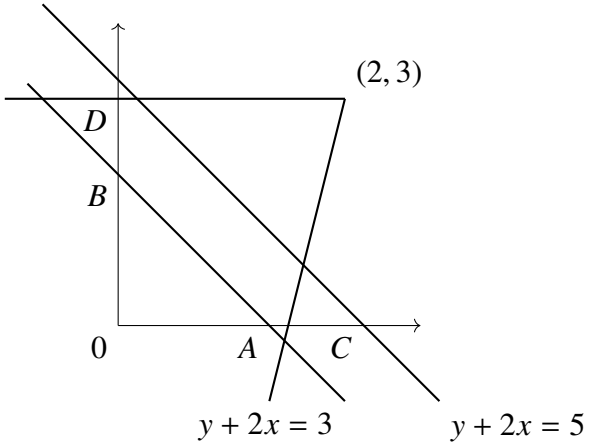
## I. E - Subjective Problems

4) (1979)
   a) Two vertices of a triangle are $(5,-1)$ and $(2,-3)$.If the orthocentre of the triangle is the 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 $\Delta PBC$ and $\Delta ABC$ 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 $\theta$ with each other . Find the equation of a line $L$ different from $L_2$ which passes through $P$ and make same angle $\theta$ 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 $\alpha$ for which the point $(\alpha, \alpha^2)$ lies inside the triangle formed by the lines. (1992-6M)

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