Higher Mathematics

Straight Line
Basic Skills

1. Find the equation of the line through A (4,1) which is parallel to the line $3x + 2y = 8$.

2. The lines $y = 3x + 4$ and $x - ay - 2 = 0$ are perpendicular.
   Calculate the value of a .

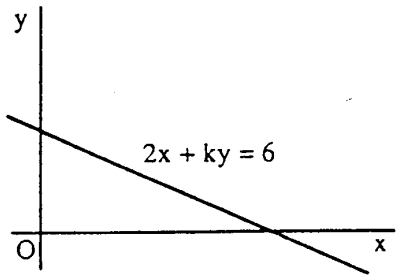
3. Prove that the points A (7,-3) , B (-1,3) and C (-5,6) are collinear .

4. The vertices of triangle PQR are P (6,1) , Q (12,7) and R (-2,5) . Find the equation of the median through Q .

5. Calculate the size of the angle , correct to 1 decimal place , that the line joining (-4,3) and (3,8) makes with the positive x-axis .

6. Prove that P (5,-1) , Q (15,3) , R (11,13) and S (1,9) are the vertices of a square .

7. The area of the triangle bounded by the coordinate axis and the line $2x + ky = 6$, is k .
   Find the value of k .



8. If the line joining the points (-2,-3) and (6,t) has gradient $\frac{2}{3}$, find the value of t .

9. Show that the diagonals of the quadrilateral with vertices P (-6,-4) , Q (2,2) , R (2,12) and S (-6,6) bisect each other at right angles . What shape is PQRS ?

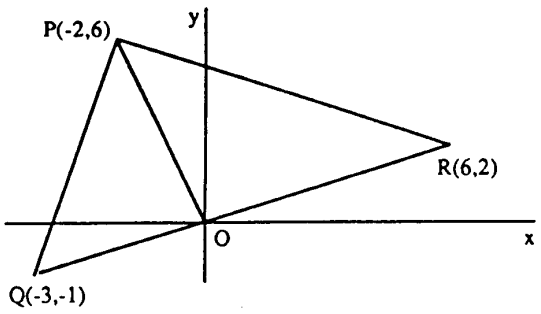
10. Show that the point $(3t , 3 - 2t)$ lies on the line $2x + 3y - 9 = 0$.

11. Triangle DEF has vertices D(4,-5) , E(-6,8) and F(-1,-2) . Obtain the equation of the altitude through D.

12. ABC is an equilateral triangle with A(5,1) and B(12,1). If C lies above AB find the equation of the line AC.

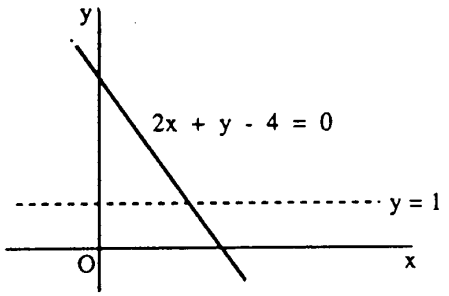
13. P and Q are points on the curve $xy = 6$ with x-coordinates 2 and -4 respectively. Find the gradient of the line PQ.

14. Triangle PQR has vertices P(-2,6) , Q(-3,-1) and R(6,2) .
O , the origin , is the foot of the perpendicular from P to QR.
Calculate the area of triangle PQR.



15. Given that the line joining the points (2,3) and (8,k) is perpendicular to the line with equation $2y - 3x + 5 = 0$, find the value of k.

16. Find the equation of the image of the line $2x + y - 4 = 0$ under reflection in the line $y = 1$.



17. A line L passes through the point (0,3) and is perpendicular to the line $x - 2y - 5 = 0$. Find the equation of the line L.

18. The straight line joining the points (0,8) and (-4,0) passes through the point (p,-4). Calculate the value of p.