Exercise 1

Distance

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

① Find the distance between the points:

(a) $(0,0)$ $(2,0)$ (b) $(4,-1)$ $(6,-1)$ (c) $(2,5)$ $(4,5)$

(d) $(-3,2)$ $(-5,2)$ (e) $(1,7)$ $(1,-1)$ (f) $(4,3)(4,9)$

(g) $(-3,-5)$ $(-3,-10)$ (h) $(5,-6)(5,6)$ (i) $(0,0)$ $(4,1)$

(j) $(0,0)$ $(-2,3)$ (k) $(1,5)$ $(2,9)$ (l) $(-1,3)$ $(2,7)$

(m) $(1,9)$ $(7,-1)$ (n) $(0,1)$ $(8,-5)$ (o) $(-2,-3)(-3,1)$

(p) $(\frac{1}{2},2)(-\frac{1}{2},1)$ (q) $(1\frac{1}{2},5)(3,3)$ (r) $(1\frac{1}{4},5)(1,3)$

② Find 2 values of k when $|AB|$ is given:

(a) A $(1,3)$ B $(2,k)$ $|AB| = \sqrt{10}$

(b) A $(-1,4)$ B $(k,7)$ $|AB| = 5$

(c) A $(2,k)$ B $(1,4)$ $|AB| = \sqrt{5}$

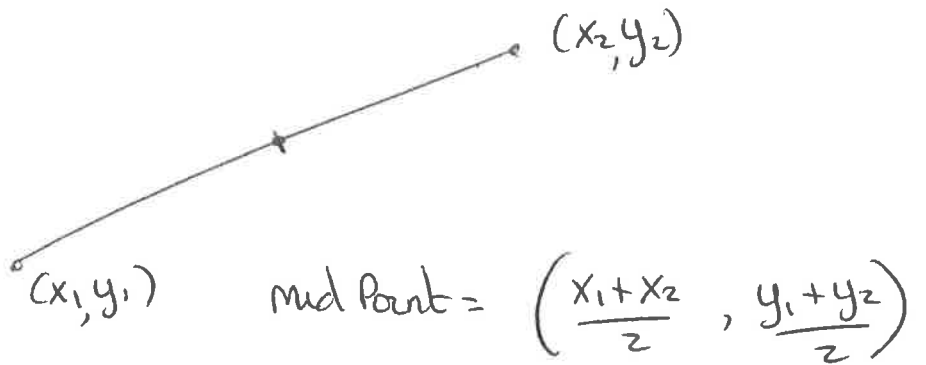(d) A $(4,k)$ B $(7,2k)$ $|AB| = \sqrt{13}$

(e) A $(4,k)$ B $(k,k+1)$ $|AB| = \sqrt{37}$

③ In $\triangle ABC$, A $(0,3)$ B$(4,7)$ C$(3,4)$
   show that $\triangle ABC$ is isosceles

④ In $\triangle PQR$ P$(3,0)$ ~~Q~~ Q$(7,k)$ R$(6,3)$
   find k y $|PQ| = |QR|$

Exercise 2 :
Mid Point
_____

(x_2, y_2)

(x_1, y_1) Mid Point $= \left(\dfrac{x_1 + x_2}{2} , \dfrac{y_1 + y_2}{2} \right)$

① Find the midpoint of the line segment joining
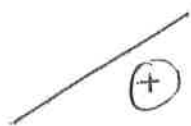the points :

(a) $(0,0)$ $(-2,4)$ (b) $(-1,4)$ $(3,0)$ (c) $(2,-1)$ $(4,3)$

(d) $(-2,4)$ $(2,-7)$ (e) $(7,3)$ $(2,-4)$ (f) $(3\frac{1}{2}, 2)(-1\frac{1}{2},-1)$

(g) $(-2,-8)$ $(-4,-10)$ (h) $(k,3)(-k,-9)$ (i) $(2k+4, k+6)$
                                                            $(6k+2, k-6)$

② P is the midpoint of $[AB]$. Find the co-ordinates
of B

(a) $A(2,1)$ $P(4,2)$ (b) $A(-4,6)$ $P(2,7)$

(c) $A(-4,-1)$ $P(2,0)$ (d) $A(2,-3)$ $P(-2,4)$

(e) $A(4,-2)$ $P(7,-5)$ (f) $A(-1,-5)$ $P(-3,5)$

(g) $A(4,k)$ $P(2,0)$ (h) $A(k,3)$ $P(k+1,1)$

Exercise 3
Slope

$$m = \frac{\text{Rise}}{\text{Run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

① Find the slope of the line passing through the points:

(a) $(1,2)(4,3)$ (b) $(-1,4)(2,7)$ (c) $(0,3)(2,-1)$

(d) $(-5,1)(-2,3)$ (e) $(-4,1)(-2,-3)$ (f) $(5,-9)(4,3)$

(g) $(2,-1)(-1,2)$ (h) $(2,-1)(1\frac{1}{2},3)$ (i) $(3, 4\frac{1}{2})(-1,2)$

(j) $(-\frac{1}{2},4)(2,\frac{1}{2})$ (k) $(k+1,3)(k-2,4)$ (l) $(2k-1,4)(2k+1,3)$

② Find the value of k when the slope is given:

(a) $(2,7)$ $(3,k)$ $m = 2$

(b) $(-1,2)$ $(2,k+4)$ $m = -1$
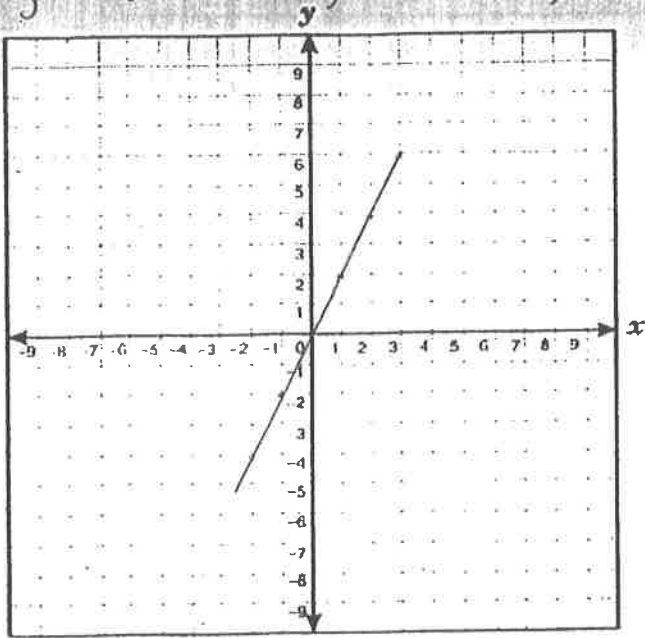
(c) $(3,k)$ $(0,4)$ $m = -3$

(d) $(k,2)$ $(3,7)$ $m = \frac{1}{2}$
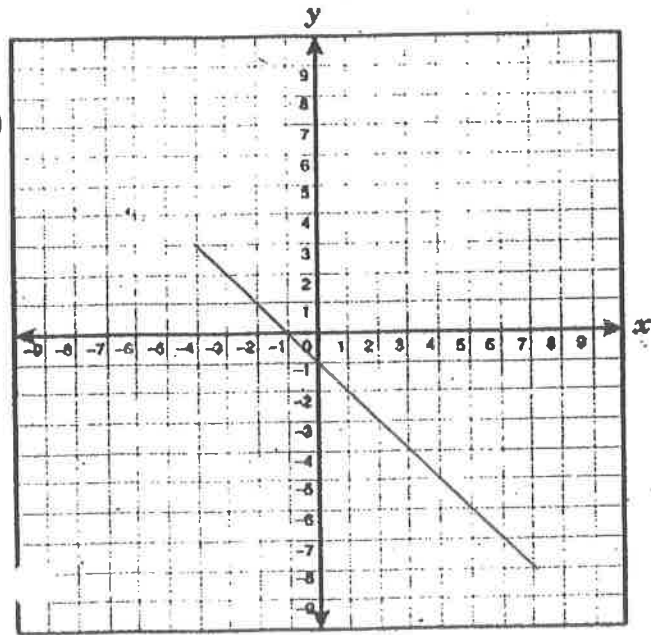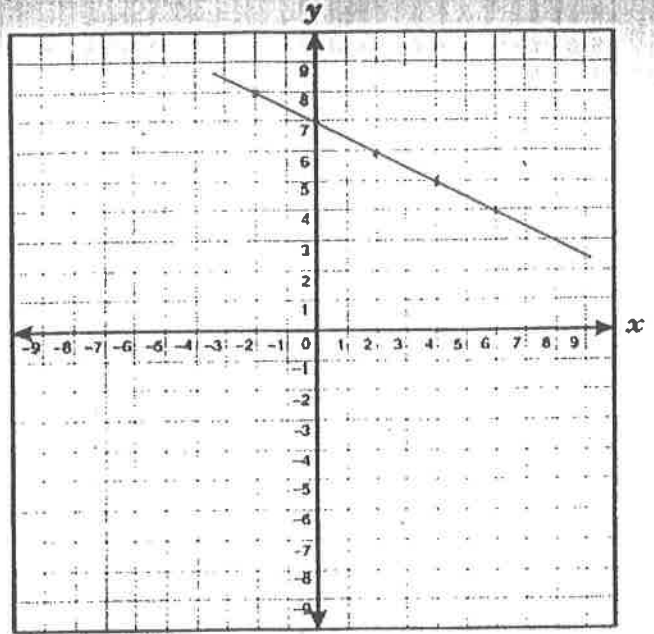
(e) $(k+1,5)$ $(2k,3)$ $m = \frac{2}{3}$

(f) $(4,k)$ $(k,3)$ $m = 1$
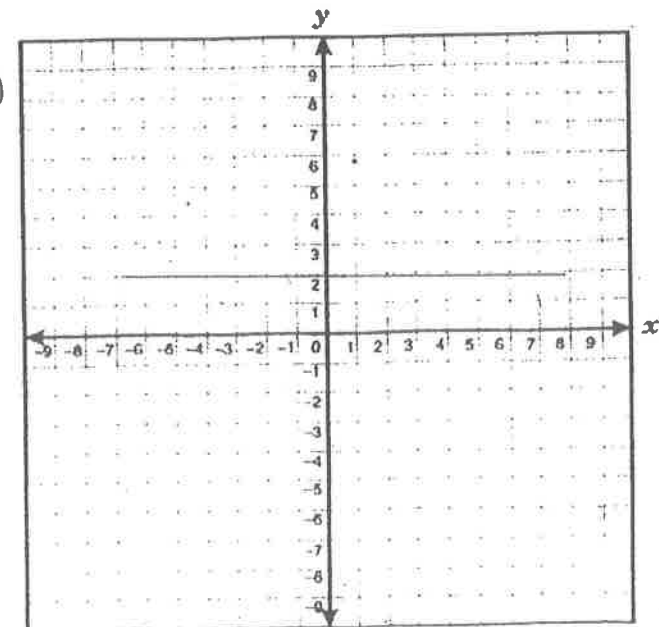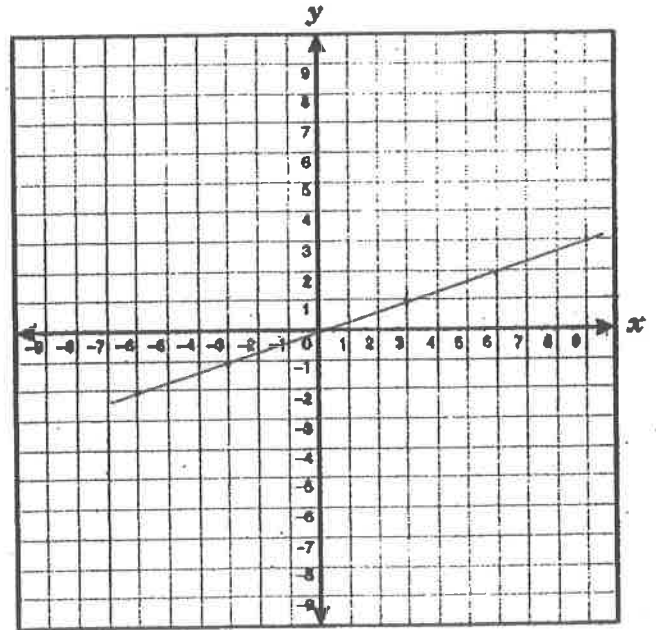
(g) $(k,2)$ $(k+1,k)$ $m = -3/4$
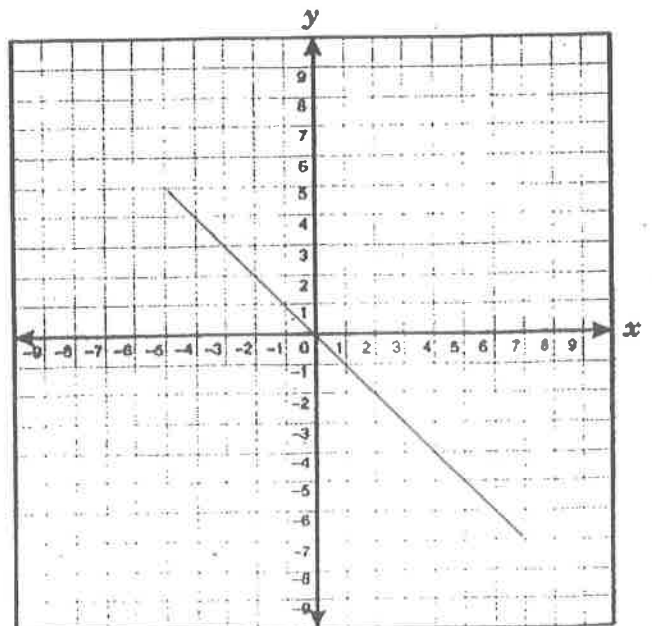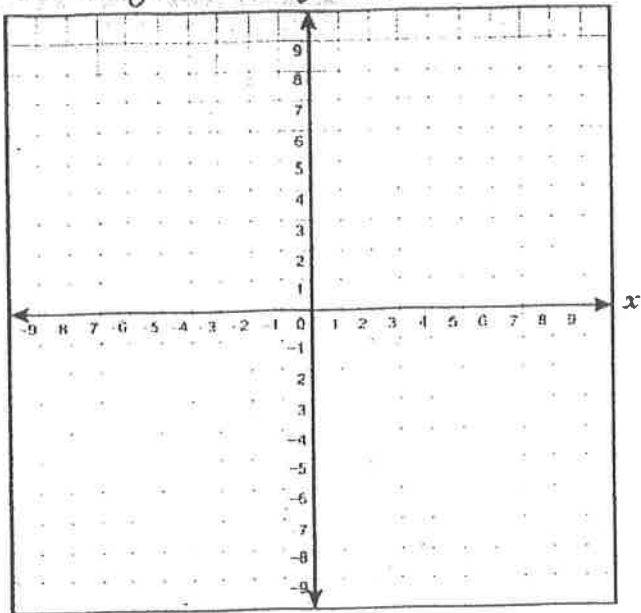
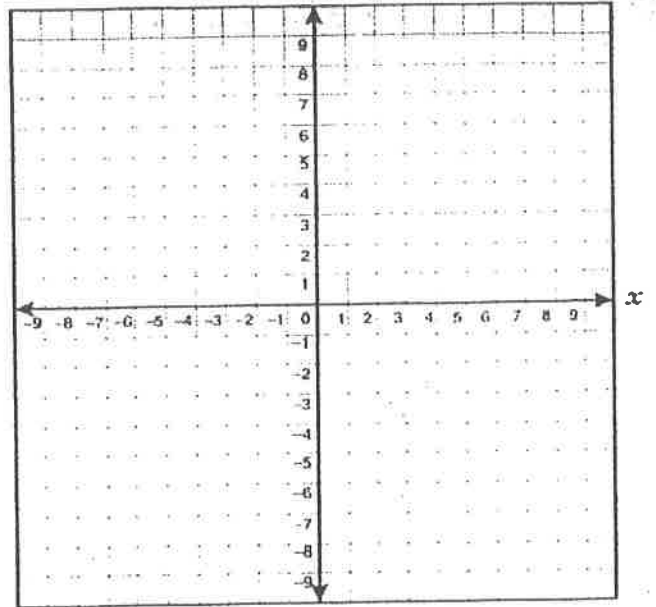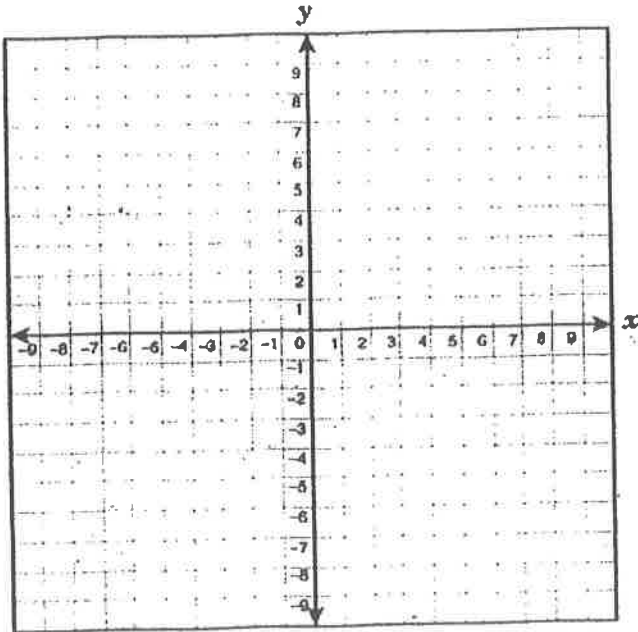Given slope of each of these lines

a)

(b)

c)

(d)

e)

(f)

4) Through the given point, draw a line with the given slope.

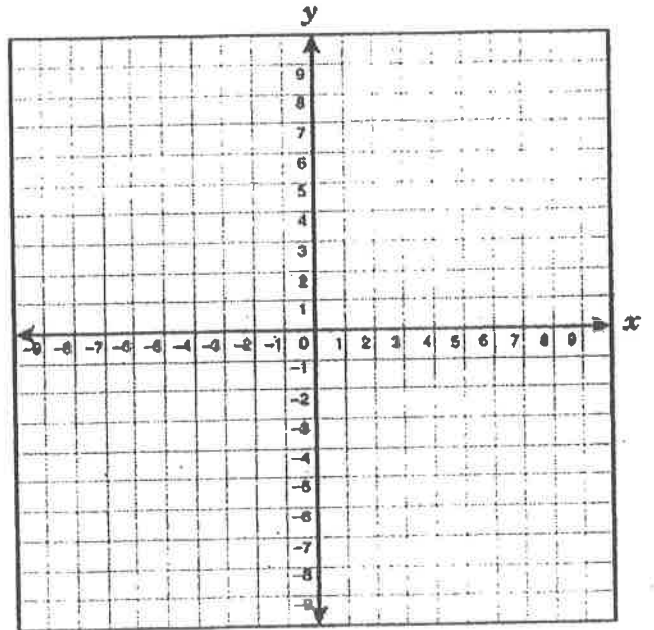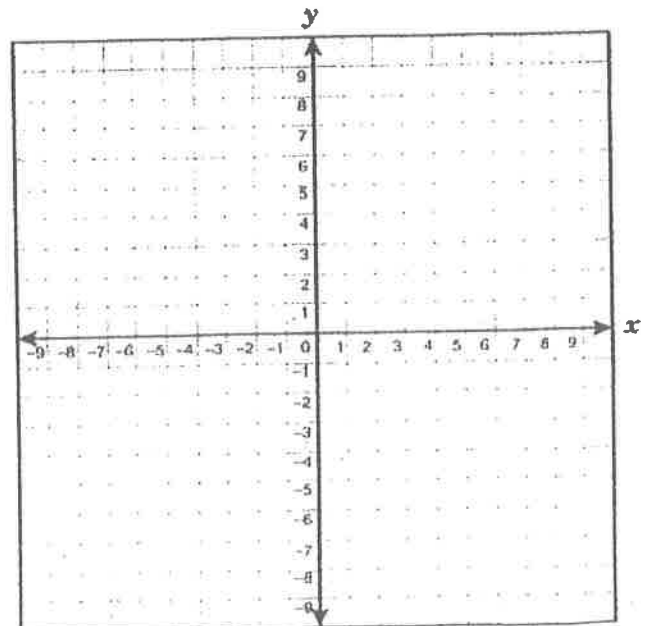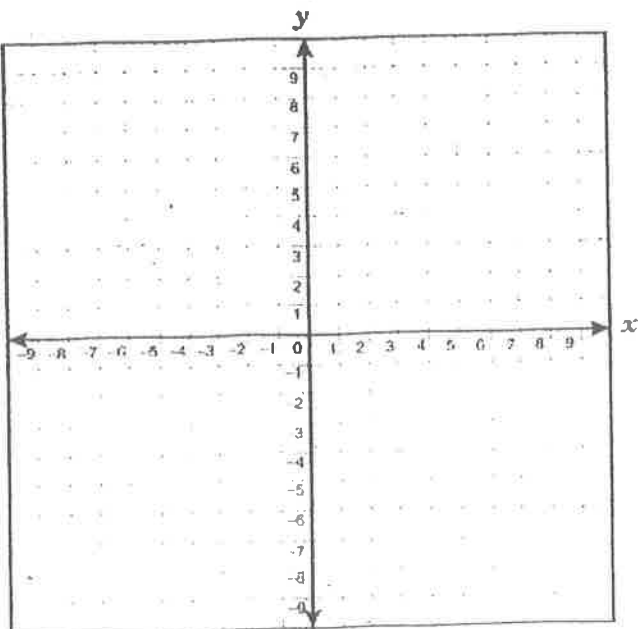(a)   (1,2) , $m = \frac{1}{2}$

(b)   (0,0) , $m = -\frac{1}{2}$

(c)   (-1,3) , $m = \frac{3}{2}$

(d)   (-2,-1) , $m = -\frac{2}{1}$

Exercise 4
Slope

① is AB/CD ? Justify your answer.

a) $A(4,7)$, $B(5,9)$, $C(-1,3)$, $D(0,5)$

b) $A(-1,-3)$, $B(1,4)$, $C(3,0)$, $D(5,-7)$

c) $A(-4,2)$, $B(6,-3)$, $C(8,-1)$, $P(6,-2)$

d) $A(-3,-5)$, $B(2,1)$, $C(3,8)$, $D(-3,2)$

② is $AB \perp CD$? Justify your answer.

a) $A(0,4)$, $B(2,5)$, $C(3,1)$, $D(4,-1)$

b) $A(-1,-3)$, $B(2,0)$, $C(2,5)$, $D(1,4)$

c) $A(2,0)$, $B(-4,-2)$, $C(1,4)$, $D(3,-2)$

d) $A(-4,2)$, $B(3,6)$, $C(-3,-5)$, $D(2,2)$

③ Find k if AB/CD

a) $A(2,1)$, $B(4,3)$, $C(3,7)$, $D(5,k)$

b) $A(-1,2)$, $B(3,4)$, $C(-10,5)$, $D(-8,-k)$

c) $A(4,-1)$, $B(-2,3)$, $C(1,k)$, $D(k,3)$

④ Find k if $AB \perp CD$

a) $A(2,3)$, $B(3,5)$, $C(1,4)$, $D(8,k)$

b) $A(-1,2)$, $B(1,7)$, $C(2,k)$, $D(3,1)$

c) $A(2,-4)$, $B(-3,2)$, $C(k,3)$, $D(4,10)$

⑤ Test if P, Q and R are collinear Points

a) $P(1,4)$, $Q(2,6)$, $R(6,14)$

b) $P(0,-3)$, $Q(-1,4)$, $R(-2,11)$

c) $P(1,-1)$, $Q(3,-2)$, $R(-1,0)$

⑥ In $\triangle ABC$, $A(3,1)$, $B(7,10)$, $C(5,5\frac{1}{2})$
show that the triangle is right-angled.

Exercise 5
Equation of a line

① Write the slope of these lines

a) $3x + y + 7 = 0$

b) $2x - y - 1 = 0$

c) $4x + 5y + 9 = 0$

d) $3x - 2y + 5 = 0$

e) $2x + 4y + 1 = 0$

f) $6x - 3y - 5 = 0$

g) $4x + 4y - 1 = 0$

② Find the value of k if the point is on the line

a) $2x + 3y - 1 = 0$ $(k, -1)$

b) $4x - y - 7 = 0$ $(2, k)$

c) $5x + 3y + k = 0$ $(-1, -2)$

d) $3x - 2y + k = 0$ $(0, -\frac{1}{2})$

e) $5x + 4y + k = 0$ $(-1, 3/4)$

f) $2x + ky + 1 = 0$ $(0, -1)$

g) $kx + 2y + 3 = 0$ $(-1, 1)$

h) $2x - 3y + k = 0$ $(0, 0)$

③ Find the equation of the line

a) $m = 2$, $(1, 5)$

b) $m = -3$, $(2, -1)$

c) $m = -4$, $(-1, -4)$

d) $m = \frac{1}{2}$, $(2, -3)$

e) $m = \frac{2}{5}$, $(1, 1)$

f) $m = -\frac{2}{3}$, $(0, 3)$

g) $m = -\frac{14}{3}$, $(-1, 0)$

h) $m = \frac{9}{4}$, $(0, 0)$

i) $m = 4$, $(2\frac{1}{2}, 1)$

④ Find the equation of the line through

    a)   (3,1) (5,5)   h) (-2,7) (0,1)

    b)   (3,2) (4,3)   i) (2,-9) (0,-1)

    c)   (4,7) (3,1)   J) (-4,1) (-3,6)

    d)   (5,8) (2,2)   k) (-1,-9) (-2,-2)

    e)   (2,0) (0,6)   L) (-1,-2) (0,2)

    f)   (3,1) (2,6)   m) (-2,-5) (8,1)

    g)   (-1,6) (1,2)   n) (-1,3) (7,-5)

⑤ Find equation of line parallel to

    a) $x + y + 7 = 0$, through (-1,2)

    b) $2x + 3y - 1 = 0$, through (-1,5)

    c) $3x - y - 5 = 0$, through (2,0)

    d) $5x - 2y + 3 = 0$, through $(-1, \frac{1}{2})$

    e) $4x + 5y = 0$, through $(\frac{3}{4}, -1)$

    f) $2x + 4y - 3 = 0$, through (0,0)

    g) $4x + y + 1 = 0$, through $(2, \frac{1}{2})$

⑥ Find equation of line perpendicular to

    a) $x + y + 3 = 0$, through (2,1)

    b) $2x + 5y - 1 = 0$, through (-1,1)

    c) $3x - 2y + 1 = 0$, through (0,-3)

    d) $5x - 4y - 2 = 0$, through $(2\frac{1}{2}, -1)$

    e) $x - 3y + 5 = 0$, through (0,0)

    f) $4x + 2y + 1 = 0$, through (-1,-1)

    g) $7x - 4y - 3 = 0$, through $(\frac{1}{2}, -1)$

Exercise 6

① Find area of △ formed by the line and the axes:

a) $3x + y - 6 = 0$

b) $x - 3y + 9 = 0$

c) $2x + 5y + 10 = 0$

d) $3x - 4y + 12 = 0$

e) $2x + y + 1 = 0$

f) $x - 3y - 2 = 0$

g) $4x - 3y + 5 = 0$

② Find the area of △OAB

a) $O(0,0)$ $A(3, 5)$ $B(-1, 4)$

b) $O(0,0)$ $A(-2, -6)$ $B(5, 1)$

c) $O(0,0)$ $A(2, 5)$ $B(4, 1)$

d) $O(0,0)$ $A(-2, -3)$ $B(-1, 4)$

③ Find the area of △PQR

a) $P(1,0)$ $Q(3,4)$ $R(2,7)$

b) $P(3,-1)$ $Q(4,2)$ $R(-1,6)$

c) $P(-1,-5)$ $Q(8,-1)$ $R(2,3)$

d) $P(-2,3)$ $Q(2,-2)$ $R(5,1)$

④ Find the area of parallelogram OABC

a) $O(0,0)$ $A(5,1)$ $B(6,4)$ $C(1,3)$

b) $O(0,0)$ $A(3,-2)$ $B(6,2)$ $C(3,4)$

⑤ Find the area of parallelogram PQRS

a) $P(6,2)$ $Q(8,5)$ $R(9,9)$ $S(7,6)$

b) $P(-1,3)$ $Q(2,5)$ $R(4,9)$ $S(1,7)$

c) $P(-6,0)$ $Q(-4,-1)$ $R(-1,4)$ $S(-3,5)$

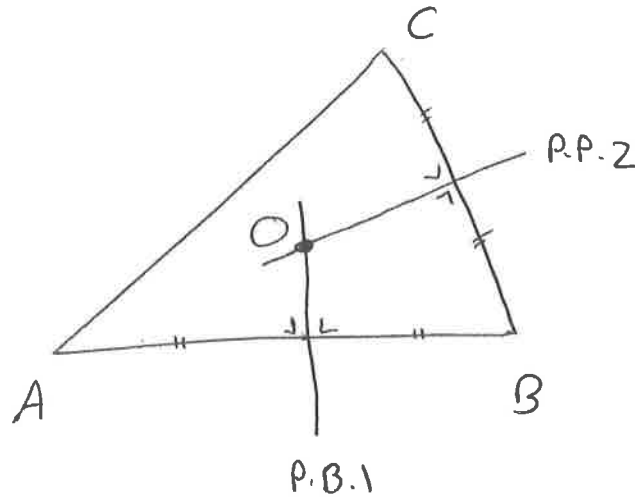d) $P(-2,5)$ $Q(3,-2)$ $R(6,1)$ $S(1,8)$

⑥ Find the area of Quadrilateral with vertices

a) $(0,0)$ $(2,-1)$ $(4,3)$ $(1,7)$ b) $(-1,-3)$ $(1,1)$ $(0,10)$ $(-4,4)$

c) $(2,-5)$ $(3,5)$ $(1,6)$ $(-1,-4)$
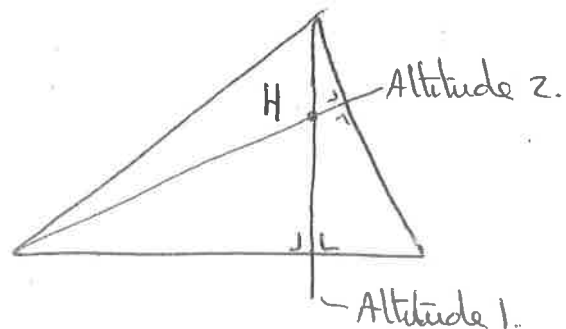
Exercise 7 : (Much harder!)

Circumcentre, O = point of intersection of the
perpendicular bisectors of any 2 sides

C

P.P.2

O

A   B

P.B.1

① Find circumcentre of △ with vertices
   i) $(-3,-3)$ $(5,1)$ $(11,-1)$
   ii) $(4,6)$ $(-4,-2)$ $(10,0)$

Orthocentre, H = point of intersection of any 2
altitudes.

   Altitude = perpendicular from a vertex
   to its opposite side

H   Altitude 2.

Altitude 1.

② Find orthocentre of △
   with vertices
   i) $(0,3)$ $(7,4)$ $(4,-5)$
   ii) $(-6,3)$ $(-2,5)$ $(10,0)$