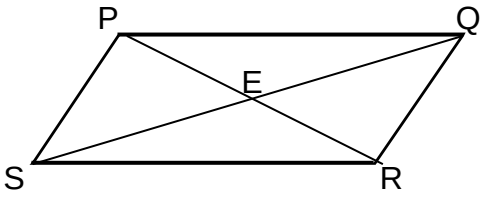
Equation of a line

1. ABCD is a parallelogram. A, B and C have coordinates (3,4), (5,8) and (9,12).
   Find the equation of DC.

2. PQRS is a parallelogram whose diagonals meet at E.
   P is the point (-2,-2), Q is (0,2) and E is (2,0).
   Find the equation of the line RS.



3. A triangle ABC has vertices A(2,5). B(4,-1) and C(10,5).

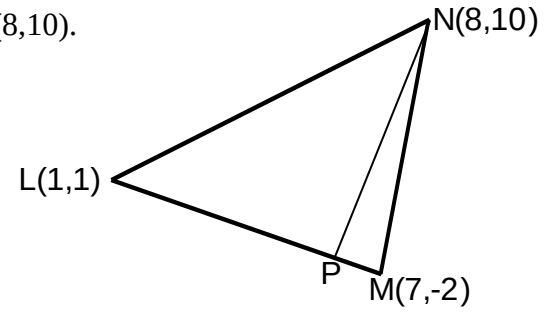
   (a) Write down the equation of the perpendicular bisector of AC.
   (b) Find the equation of the altitude CD.
   (c) Find the point of intersection of these two lines.

4. A triangle has vertices A(1,1), B(3,5) and C(11,1).

   (a) Show that triangle ABC is right angled at B.
   (b) Find the equations of the medians AD and BE.
   (c) AD and BE intersect at M. Find the coordinates of M.

5. A triangle has vertices L(1,1), M(7,-2) and N(8,10).

   (a) Find the equation of the altitude NP.
   (b) Find the coordinates of P.



6. A triangle has vertices P(-9,4), Q(-5,12) and R(-5,2).

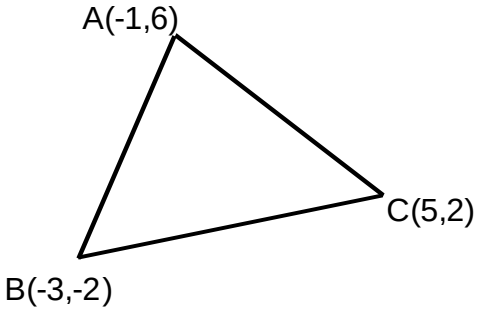
   (a) Find the equation of the perpendicular bisector of QR.
   (b) Find the equation of the perpendicular bisector of PR.
   (c) Find the point of intersection of these lines.

7. Triangle DEF has vertices (2,3), (-3,-2) and (3,0) respectively.

   (a) Find the equations of the perpendicular bisectors of the sides EF and DF.
   (b) Find the coordinates of T, the point of intersection of these lines.
   (c) Show that D, T and E are collinear.

8. Triangle ABC has vertices A(-1,6), B(-3,-2) and C(5,2). Find

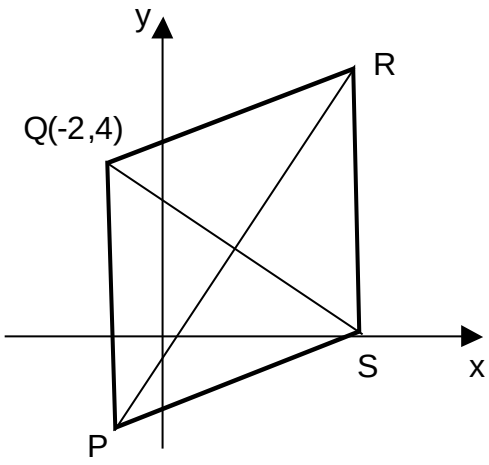
   (a) the equation of the median from C.
   (b) the equation of the perpendicular bisector of BC.
   (c) the coordinates of the point of intersection of these lines.



9. The diagram shows a rhombus PQRS with its diagonals PR and QS.

PR has equation $y = 2x - 2$.
Q has coordinates (-2,4).

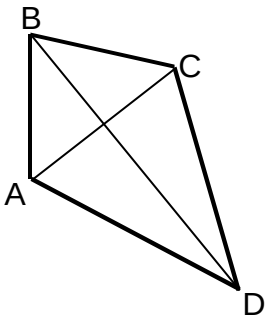
(a) Find the equation of the diagonal QS.
(b) Find the coordinates of T, the point of intersection of PR and QS.
(c) R is the point (5,8). Write down the coordinates of P.



10. A kite ABCD has diagonals AC and BD.

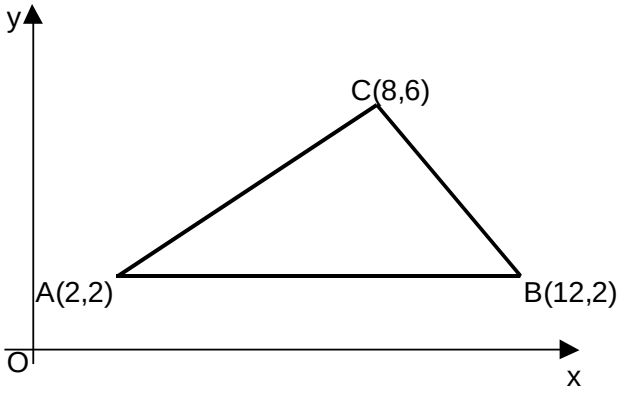
AC has equation $2y = x - 2$.
D is the point (6,-3).

(a) Find the equation of the diagonal BD.
(b) Find the coordinates of the point of intersection of these diagonals.



11. Triangle ABC has vertices A(2,2), B(12,2) and C(8,6).

(a) Write down the equation of the perpendicular bisector of AB.
(b) Find the equaton of the perpendicular bisector of AC.
(c) Find the point of intersection of these lines.



12. P, Q and R have coordinates (2,-1), (7,4) and (10,15) respectively and are three vertices of a kite PQRS.

(a) Find the equations of the diagonals of this kite and the coordinates of the point where they intersect.
(b) Find the coordinates of the fourth vertex S.