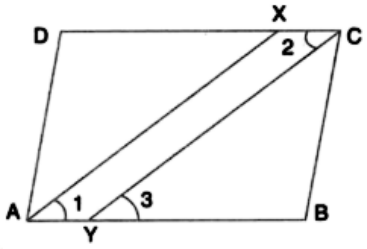
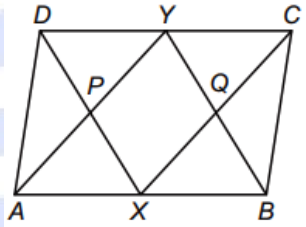
1. Show that the diagonals of a square are equal and bisect each other at right angles.

2. ABCD is a parallelogram and line segments A X, C Y bisect the angles A and C, respectively (Fig.). Show that $AX \parallel CY$.



3. The angle bisectors of a parallelogram form a rectangle. A parallelogram ABCD in which bisectors of angles A, B, C, D int m a quadrilateral P Q R S.

4. In Fig., X, Y are the mid–points of opposite sides A B and DC of a parallelogram ABCD. AY and D X are joined intersecting in P; C X and BY are joined intersecting in Q. Show that



(i) AXCY is a parallelogram (ii) DXBY is a parallelogram,

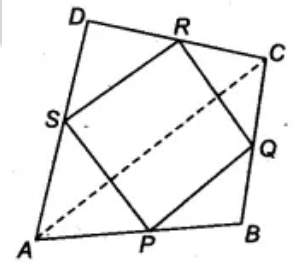
(iii) $\square$ PXQY is a parallelogram.

5. ABCD is a square E, F, G and H are points on AB, BC, CD and DA respectively, such that $AE = BF = CG = DH$. Prove that EFGH is a square.

6. Prove that the figure formed by joining the mid–points of the pairs of consecutive sides of a quadrilateral is a parallelogram.

OR

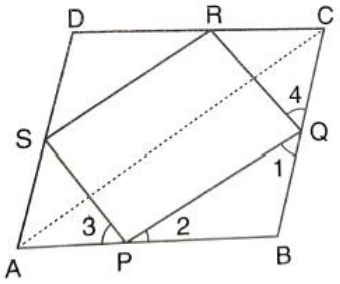
ABCD is a quadrilateral in which P, Q, R and S are mid–points of the sides AB, BC, CD and DA respectively. AC is a diagonal. Show that:



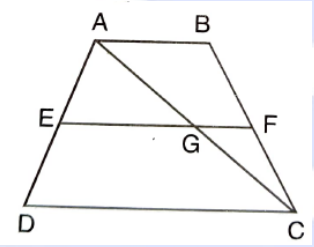
(i) $PQ \parallel AC$ and $PQ = \frac{1}{2}AC$ (ii) $SR \parallel AC$ and $SR = \frac{1}{2}AC$

(iii) $PQ = SR$ (iv) PQRS is a parallelogram.

7. $\square ABCD$ is a rhombus and P, Q, R, S arethemid – pointsof A B, B C, C D, D A respectively. Prove that $\square PQRS$ is a rectangle.



8. In Fig., ABCD is a trapezium in which side AB is parallel to side DC and E is the mid–point of side AD. If F is a point on the side BC such that the segment EF is parallel to side DC. Prove that F is the mid–point of B C and $EF = \frac{1}{2}(AB + DC)$.



9. In Fig., ABCD is a parallelogram. E and F are the mid–points of the sides AB and CD respectively. Prove that the line segments AF and CE trisect (divide into three equal parts) the diagonal BD.