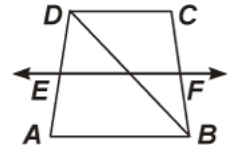


Q1. Show that the diagonals of a rhombus are perpendicular to each other.

Q2. The angles of quadrilateral are in the ratio 3 : 5 : 9 : 13. Find all the angles of the quadrilateral.

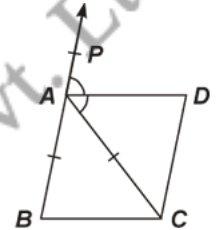
Q3. $ABCD$ is a trapezium in which $AB \parallel DC$, BD is a diagonal and E is the mid-point of AD . A line is drawn through E parallel to AB intersecting BC at F (see figure). Show that F is the mid-point of BC .



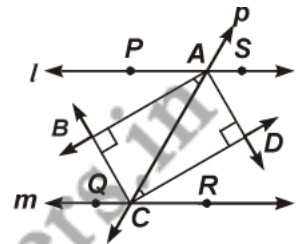
Q4. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other.

Q5. Show that each angle of a rectangle is a right angle.

Q6. ABC is an isosceles triangle in which $AB = AC$. AD bisects exterior angle PAC and $CD \parallel AB$ (see figure). Show that (i) $\angle DAC = \angle BCA$ and (ii) $ABCD$ is a parallelogram.

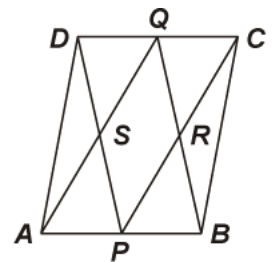


Q7. Two parallel lines l and m are intersected by a transversal p (see figure). Show that the quadrilateral formed by the bisectors of interior angles is a rectangle.



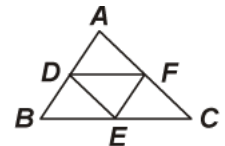
Q8. Show that the bisectors of angles of a parallelogram form a rectangle.

Q9. $ABCD$ is a parallelogram in which P and Q are mid-points of opposite sides AB and CD (see figure). If AQ intersects DP at S and BQ intersects CP at R , show that:

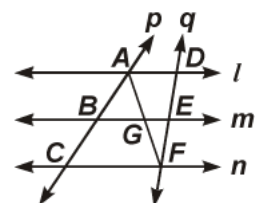


- (i) $APCQ$ is a parallelogram (ii) $DPBQ$ is a parallelogram
(iii) $PSQR$ is a parallelogram

Q10. In $\triangle ABC$, D, E and F are respectively the mid-points of sides AB, BC and CA (see figure). Show that $\triangle ABC$ is divided into four congruent triangles by joining D, E and F .



Q11. l, m and n are three parallel lines intersected by transversals p and q such that l, m and n cut off equal intercepts AB and BC on p (see figure). Show that l, m and n cut off equal intercepts DE and EF on q also.



Q12. If the diagonals of a parallelogram are equal, then show that it is a rectangle.

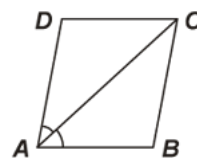
Q13. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

Q14. Show that the diagonals of a square are equal and bisect each other at right angles.

Q15. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is square.

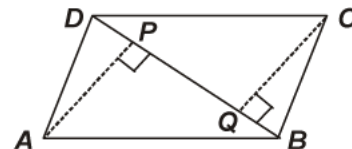
Q16. Diagonal AC of a parallelogram $ABCD$ bisects $\angle A$ (see figure). Show that:

- (i) it bisects $\angle C$ also, (ii) $ABCD$ is a rhombus.



Q17. $ABCD$ is a parallelogram and AP and CQ are perpendicular from vertices A and C on diagonal BD (see figure). Show that:

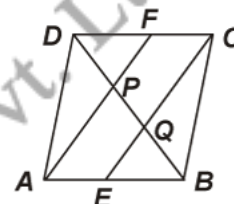
- (i) $\triangle APB \cong \triangle CQD$ (ii) $AP = CQ$



Q18. $ABCD$ is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral $PQRS$ is a rectangle.

Q19. $ABCD$ is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral $PQRS$ is a rhombus.

Q20. In a parallelogram $ABCD$, E and F are the mid-points of sides AB and CD respectively (see figure). Show that the line segments AF and EC trisect the diagonal BD .

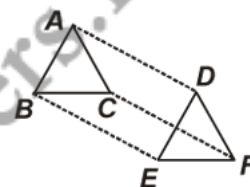


Q21. ABC is a triangle right angled at C . A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D . Show that

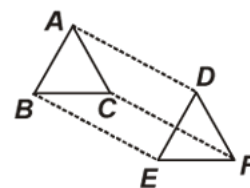
- (i) D is the mid point of AC (ii) $MD \perp AC$ (iii) $CM = MA = \frac{1}{2} AB$.

Q22. In $\triangle ABC$ and $\triangle DEF$, $AB = DE, AB \parallel DE, BC = EF$ and $BC \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that:

- (i) quadrilateral $ACFD$ is a parallelogram
(ii) $AC = DF$.



Q23. In $\triangle ABC$ and $\triangle DEF$, $AB = DE, AB \parallel DE, BC = EF$ and $BC \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that: $\triangle ABC \cong \triangle DEF$.



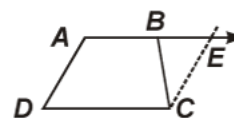
Q24. $ABCD$ is a rhombus. Show that diagonal AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$.

Q25. $ABCD$ is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that:

- (i) $ABCD$ is a square (ii) Diagonal BD bisects $\angle B$ as well as $\angle D$.

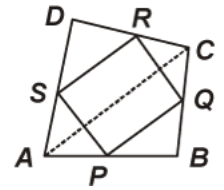
Q26. $ABCD$ is a trapezium in which $AB \parallel CD$ and $AD = BC$ (see figure). Show that

- (i) $\angle A = \angle B$ (ii) $\angle C = \angle D$
(iii) $\triangle ABC \cong \triangle BAD$ (iv) Diagonal $AC =$ Diagonal BD



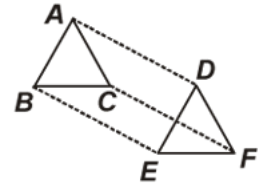
[Hint: Extend AB and draw a line through C parallel to DA intersecting AB produced at E .]

Q27. $ABCD$ is quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA (see figure). AC is a diagonal. Show that:



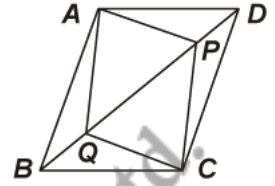
- (i) $SR \parallel AC$ and $SR = \frac{1}{2} AC$ (ii) $PQ = SR$ (iii) $PQRS$ is a parallelogram.

Q28. In $\triangle ABC$ and $\triangle DEF$, $AB = DE$, $AB \parallel DE$, $BC = EF$ and $BC \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that:



- (i) quadrilateral $ABED$ is a parallelogram
 (ii) quadrilateral $BEFC$ is a parallelogram
 (iii) $AD \parallel CF$ and $AD = CF$

Q29. In parallelogram $ABCD$, two points P and Q are taken on diagonal BD such that $DP = BQ$ (see figure). Show that:



- (i) $\triangle APD \cong \triangle CQB$ (ii) $AP = CQ$
 (iii) $\triangle AQB \cong \triangle CPD$ (iv) $AQ = CP$
 (v) $APCQ$ is a parallelogram

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- S1.** Proved.
- S2.** $36^\circ, 60^\circ, 108^\circ$ and 156° .
- S3.** Try yourself.
- S4.** Try yourself.
- S5.** Proved.
- S6.** Proved.
- S7.** Proved.
- S8.** Proved.
- S9.** Proved.
- S10.** Proved.
- S11.** Proved.
- S12.** Try yourself.
- S13.** Try yourself.
- S14.** Try yourself.
- S15.** Try yourself.
- S16.** (i) From $\triangle DAC$ and $\triangle BCA$, show $\angle DAC = \angle BCA$ and $\angle ACD = \angle CAB$, etc.
(ii) Show $\angle BAC = \angle BCA$, using Theorem : In a parallelogram, opposite angle are equal.
- S17.** Try yourself.
- S18.** Show $PQRS$ is a parallelogram. Also show $PQ \parallel AC$ and $PS \parallel BD$. So, $\angle P = 90^\circ$.
- S19.** Try yourself.
- S20.** $AECF$ is a parallelogram. So, $AF \parallel CE$, etc.
- S21.** Try yourself.
- S22.** Try yourself.
- S23.** Try yourself.
- S24.** Try yourself.

S25. Try yourself.

S26. Try yourself.

S27. Try yourself.

S28. Try yourself.

S29. Try yourself.

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