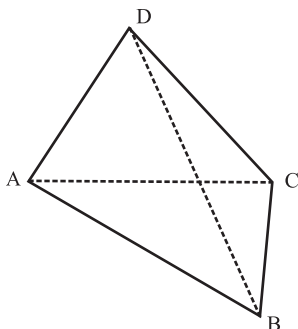# QUADRILATERALS

KEY POINTS

1. Quadrilateral : - A figure bounded by four line sigments. In a quadrilateral are


    i)   Two pairs of opposite side (no common point)

    ii)   Two pairs of opposite angles $\angle A$ & $\angle C$ and $\angle B$ & $\angle D$.

    (iii)   Four pairs of adjacent sides AB & BC, BC & CD, CD & AD and AD & AB (one common point)

    (iv)   Four pairs of adjacent angles $\angle A$ & $\angle B$, $\angle B$ & $\angle C$, $\angle C$ & $\angle D$, $\angle D$ & $\angle A$.

    (v)   Line segment join opposite vertices called diagonal of quadrilateral. AC & BD.

    (vi)   Sum of the angles of a quadrilateral is 360^0 $\angle A + \angle B + \angle C + \angle D = 360^0$.

2. Parallelogram : A quadrilateral is a parallelogram if.
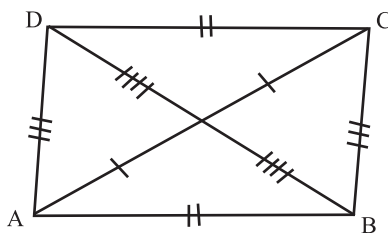

    •   Opposite sides are equal or

    •   Opposite angles are equal or

    •   Diagonals bisects each other or

    •   One pair of opposite sides is equal and parallel

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3. A diagonal of a parallelogram divides it into two congruent triangles examples of parallelogram.

Square   Rhombuss   Rectangle
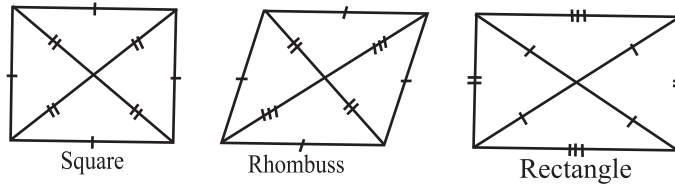
4. Theorem :- A line segment joining the mid points of the two sides of a triangle is parallel to the third side and is half of it. If D & E are mid points then DE II BC and DE = $\frac{1}{2}$ BC.
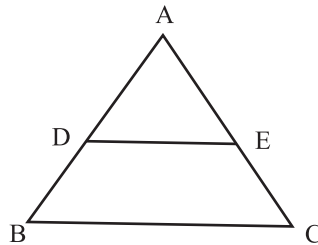

5. Converse of mid point therom.

    The line drawn through the mid point of one side of a triangle, parallel to another side bisects the third side.

Part – A

1. In a rhombus ABCD, if $\angle A = 60^0$ find $\angle B$, $\angle C$ & $\angle D$.

2. The angles of a quadrilateral are in the ratio 1:2:4:5. Find the measure of each angle.

3. If in a rhombus LMNP, $\angle LNM = 40^0$ then what is the measure of $\angle LPM$?

4. In a parallelogram if all the four angles are in the ratio 1:1:1:1 then, what type of parallelogram is this one?

5. In the figure, AB II CD, what will be the measure of $\angle ADC$.
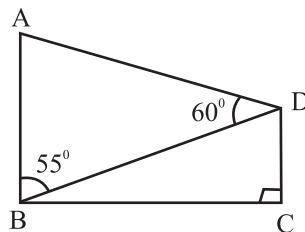
6. In the figure, if D & E are respectively the mid points of AB & AC, what will be the length of ED.
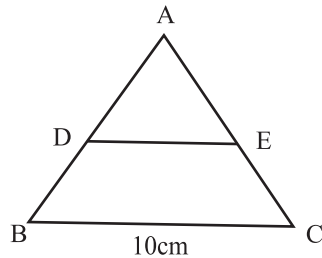
7. PQRS is a rhombus with $\angle QPS = 50^0$. Find $\angle RQS$.

8. The angles of a quadrilateral are in the ratio 2:3:5:8. Find all the angles of the quadrilateral.

9. In the figure line l ll m and p ll q, $\angle BCD = 108^0$ find all four angles of quadrilateral ABCD.
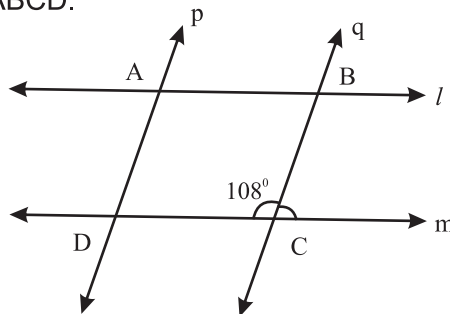
10. If two adjacent angles of a parallelogram ABCD are in the ratio 5:4 find all the angles of the parallelogram.

Part – B

11. Prove that the sum of all the four angles of a quadrilateral is 360:

12. Show that opposite angles of a parallelogram are equal.

13. In a parallelogram ABCD $\angle B = 110^0$ determine the measure of $\angle A$ and $\angle D$.

14. In the figure if PQRS is a parallelogram. Then find the value of x & y.
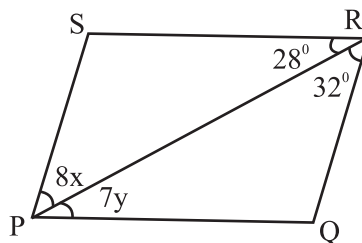
15. The diagonals of a parallelogram ABCD interest at O. A line through O intersects AB at X & DC at Y. Prove that OX=OY.

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16. In a parallelogram ABCD diagonals AC and BD intersect at O and AC = 7.4 cm. and BD = 6.2 cm. Find the length of AO and BO.

17. Two opposite angles of a parallelogram are (5x-3) and (4x+12). Find the measure of each angle of the parallelogram.

18. Diagonals of a quadrilateral ABCD bisect each other if $\angle A = 35^0$ determine $\angle B$.

19. The perimeter of a parallelogram is 30cm. If longer side is 9.5 cm then find the length of shorter side.

20. In a parallelogram ABCD diagonals AC and BD intersects at O and AC=12.6 cm and BD = 9.4 cm. Find the measures of OC and OD.

21. In the give figure P is the mid point of side BC of a parallelogram ABCD such that $\angle BAP = \angle DAP$ prove that AD = 2CD.
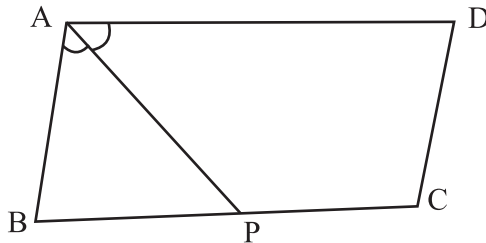
22. The angles of a quadrilateral are (x+20), (x–20), (2x+5), (2x–5). Find the value of x.

Part – C

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

24. In the adjoining figure if PQRS is a parallelogramam and $\angle PQR = 100$ and $\angle SPR = 40$. Find $\angle PRQ$ and $\angle SRQ$.
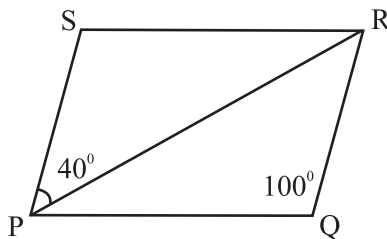

25. Prove that the line segment joining the mid points of two sides of a triangle is parallel to the third side.

26. In the given figure L, M, and N are mid point of the sides PQ, PR and QR respectively of △PQR. If PQ = 4.4cm, QR = 5.6 cm and PR = 4.8cm then find the perimeter of △LMN.
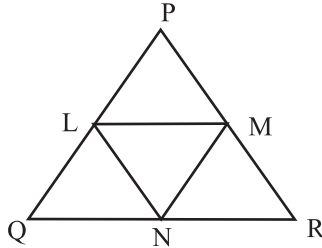
27. A quadrilateral is a parallelogram if one pair of opposite sides are equal and parallel. Prove it.

28. If the diagonals of a quadrilateral bisect each other then quadrilateral is a parallelograms. Prove it.

29. In a parallelograms PQRS, M and N are points on PQ and RS such that PM = RN Prove that MS II NQ.

30. In a parallelogram ABCD, AP and CQ are drawn perpendiculars from vertices A and C on diagonal BD. Prove that △APB ≅ △CQD.

31. The diagonals of a rectangle ABCD meet at O. ∠BOC = 50 then find ∠ODA.
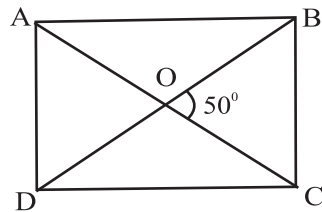
32. In the given figure AD and BE are the medians of △ABC and BE II DE prove that CF =1/4 AC.
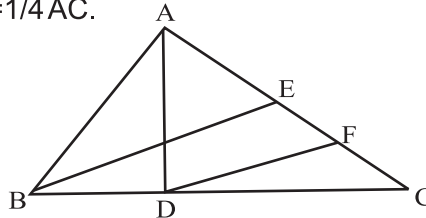
Part – D

33. AD is a median of △ABC and E is the mid point of AD, BE produced meets AC in F. Prove that, AF = 1/3 AC.

34. In the figure LMNO, is a trapezium in which LM is parallel to side ON and P is the mid point of side LO. If Q is a point on the side MN such that segment PQ is parallel to side ON Prove that Q is the mid point of MN and PQ = 1/2 (LM + ON).
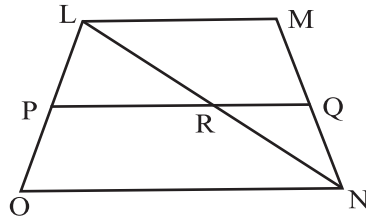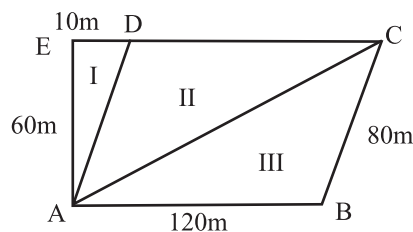

35. In the figure, ΔABC is right angled at B. If AB=9 cm AC = 15 cm. and D and E are the mid points of AB & AC respectively calculate.

    (i)   The length of BC

    (ii) The area of trapezium BCED
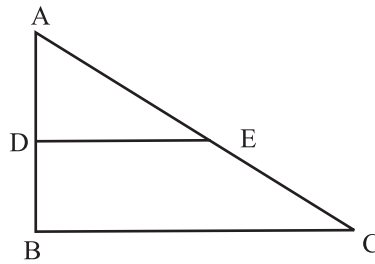
36. Show that bisectors of angles of parallelogram from a rectangle.

37. A farmer has divided his field into three parts as in the figure. Ist part is used to take care of his cattles. While II and III are used to grow two different crops.

    Answer the following :–

    i)   How much area has been used to take care for cattles ?

    ii)   Are the two areas part II and part III equal? Justify.

    iii) What is the total area of the field ?

    iv)   What values of the farmer are depicted here ?

QUADRILATERALS
ANSWERS

1. $120^0, 60^0, 120^0$

2. $30^0, 60^0, 120^0, 150^0$

3. 100^0

4. Rectangle

5. 115^0

6. 5 cm

7. 65^0

8. $40^0, 60^0, 100^0, 160^0$

9. $108^0, 72^0, 108^0, 72^0$

10. $100^0, 80^0, 100^0, 80^0$

13. $70^0, 110^0$

14. $x = y = 4$

16. 3.7 cm, 3.1 cm

17. $72^0, 108^0, 72^0, 108^0$

18. 35^0

19. 5.5 cm

20. 6.3 cm, 4.7 cm

21. 20x units

22. $x = 6$

24. $40^0, 80^0$

26. 7.4 cm

27. 65^0

35. 12 cm, $40.5 \, cm^2$