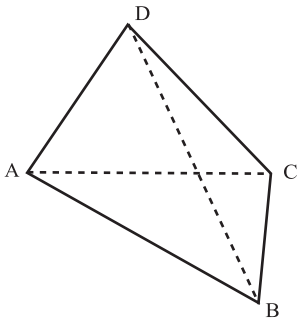
CHAPTER-8

QUARILATERAL

KEY POINTS

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



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

e.g. AB & CD, BC & AD

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

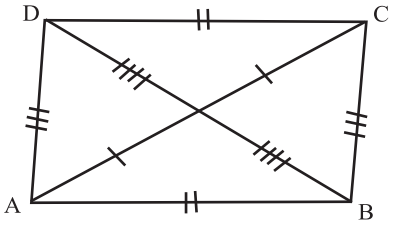
(iii) Four pairs of adjacent sides AB & BC, BC & CD, CD & AD and AD & AB (one common point)

(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 joining opposite vertices called diagonal of quadrilateral. e.g., AC & BD.

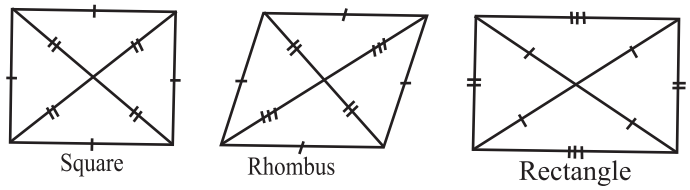
(vi) Sum of the angles of a quadrilateral is 360^0, $\angle A + \angle B + \angle C + \angle D = 360^0$.

2. Parallelogram : A quadrilateral is a parallelogram if.

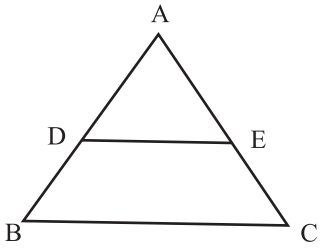


- Opposite sides are equal or
- Opposite angles are equal or
- Diagonals bisects each other or
- One pair of opposite sides is equal and parallel

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



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 theorem.

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

PART-"A"

1. Three angles of a quadrilateral are 75°, 90°, 75° the fourth angle is
   a) 90° b) 95°
   c) 105° d) 120°
2. ABCD is a rhombus such that $\angle ACB = 40°$ the $\angle ABD$ is
   a) 40° b) 45°
   c) 50° d) 60°
3. The bisector of the angles of a parallelogram enclose a
   a) Parallelogram b) Square
   c) Rhombus d) Rectangle
4. The figure obtained by joining the midpoints of the sides of quadrilateral taken in order is a
   a) Square b) Parallelogram
   c) Rectangle d) Rhombus

5. The diagnals *AC* and *BD* of a parallelogram ABCD intersect each other at point "O" If $\angle DAC = 32°$ And $\angle AOB = 70°$ then $\angle DBC$ is equal to :

   a) 24° b) 86º

   c) 38° d) 32°

6. The angles of a quadrilateral are in the ratio 3 : 4 : 5 : 6. The respective angles of the quadrilateral are

   a) 60°, 80°, 100°, 120°

   b) 120°, 100°, 80°, 60°

   c) 120°, 60°, 80°, 100°

   d) 80°, 120°, 100°, 60°

7. Line segment joining the mid points of two sides of a triangle is parallel to the third side and _____ of it.

   a) Trisect b) Bisect

   c) Half d) One Fourth

8. If two consecutive sides of a rhombus are represented by 3x - 6 and x + 14 then the perimeter of the rhombus is

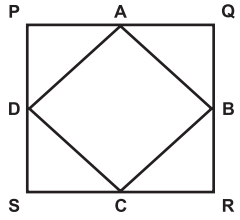
   a) 10 b) 24

   c) 70 d) 96

9. Points A, B, C and D are midpoints of the sides of square PQRS. If the area of PQRS is 36 Sqcm, the area of ABCD is ..... Sqcm

   a) $9\sqrt{2}$ b) $18\sqrt{2}$

   c) 9 d) 18



10. The perimeter of a rhombus is 60cm. If the length of its longer diagonal measures 24cm, the length of the shorter diagonal is ..... cm.

    a) 20 b) 18

    c) 15 d) 9

11. Which statement is true about all parallelogram

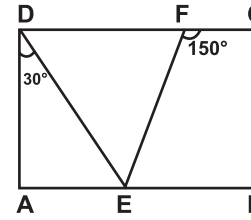
    a) The diagonals are congruent.

    b) The area is the product of two adjacent sides

    c) The opposite angles are congruent

    d) The diagonals are perpendicular to each other.

12. In the given figure *ABCD* is a rectangle m ∠ADE = 30° and m ∠CFE = 150º . What is m ∠DEF

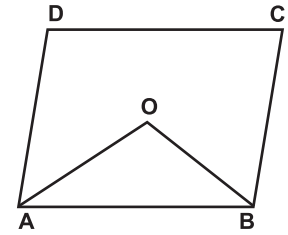


a) 90° b) 75°
c) 110º d) 85°

13. Given four points *A, B, C, D* such that three points *ABC* are collinear. By joining these points in order to get a closed figure, we get.
a) A Straight Line b) A Triangle
c) A quadrilateral d) None of these

14. Consecutive angles of parallelogram are
a) Equal b) Complimentary
c) Supplementary d) None of these

15. In parallelogram *ABCD*, bisectors of angles *A* and *B* intersect each other at "O" the value of angle *AOB* is.

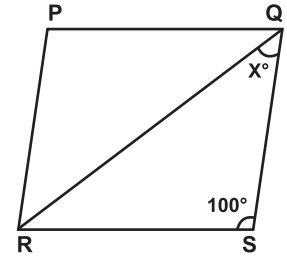


a) 90° b) 30°
c) 60° d) 120°

16. If an angle of a parallelogram is two-third of its adjacent angle the smallest angle of the parallelogram is
a) 108° b) 54°
c) 81° d) 72°

17. A parallelogram must be a rectangle if its diagonals
a) Bisect each other
b) Are congruent
c) Are Perpendicular to each other
d) None of these

18. In the given figure *PQRS* is a rhombus, then the value of *x* is
a) 40° b) 50°
c) 60° d) 80°



19. If in a rectangle ABCD, diagonal AC bisect $\angle A$ as well as $\angle C$ then ABCD is a

a) Parallelogram b) Square

c) Rhombus d) Trapezium

20. Two adjacent angles in a parallelogram are in the ratio 2 : 4. The values of angles are

a) 80°, 100° b) 40°, 140°

c) 60°, 120° d) 70° 140°

21. Which of the following statements are True (T) and which are false (F) ?

a) In a parallelogram, the diagonals are equal ( )

b) In all the angles of a quadrilateral are equal it is a parallelogram ( )

c) The diagonals of parallelogram bisect each other ( )

d) The diagonals of rhombus are equal ( )

e) All the angles of parallelogram are acute angles ( )

f) In a trapezium both pair of opposite sides are parallel ( )

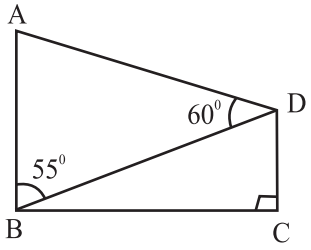
22. In a rhombus ABCD, if $\angle A = 60^0$ find $\angle B$, $\angle C$ & $\angle D$.

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

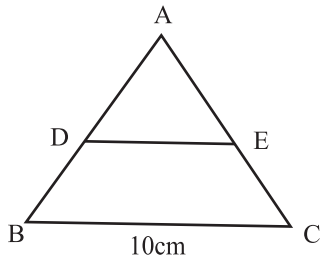
24. If in a rhombus LMNP, $\angle LNM = 40^0$ then what is the measure of $\angle LPM$?

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

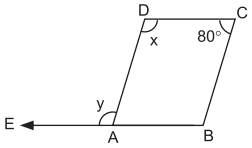
26. In the figure, AB II CD, what will be the measure of $\angle ADC$?



27. In the figure, if D & E are respectively the mid points of AB & AC, what will be the length of ED ?

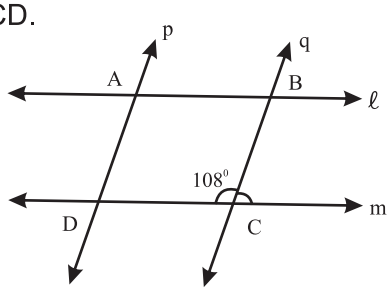


28. PQRS is a rhombus with $\angle QPS = 50^0$. Find $\angle RQS$.



29. In the figure, ABCD is a parallelogram find value of (x + y).

30. In the figure line ℓ II m and p II q, $\angle BCD = 108^0$ find all four angles of quadrilateral ABCD.



31. If two adjacent angles of a parallelogram ABCD are in the ratio 5:4, find all the angles of the parallelogram.

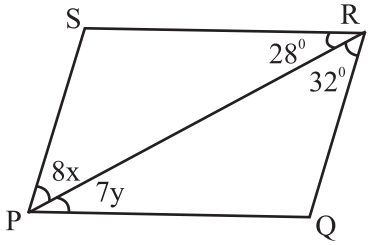
Part – B

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

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

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

35. In the figure if PQRS is a parallelogram, then find the value of x & y.



36. The diagonals of a parallelogram ABCD interest at O. A line through O intersects AB at X & DC at Y. Prove that OX=OY.

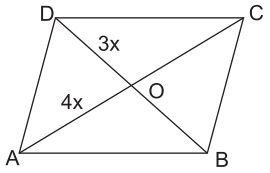
37. In a parallelogram ABCD diagonals AC and BD intersect at O and AC = 7.4 cm. and BD = 6.2 cm. Find the length of AO and BO.

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

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

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

41. 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.

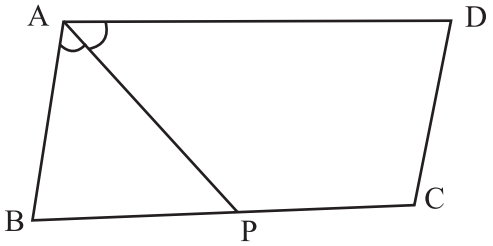


42. ABCD is a rhombus in which DO = 3x & AO = 4x, find perimeter of quadrilateral ABCD.

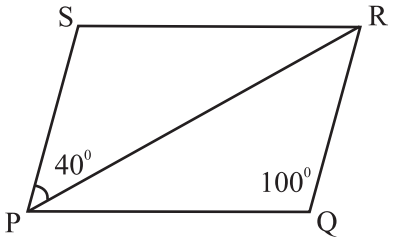
43. The angles of a quadrilateral are (x+20), (x–20), (2x+5), (2x–5). Find the value of x.

Part – C

44. In the figure P is the mid point of side BC of a parallelogram ABCD such that $\angle BAP = \angle DAP$ prove that AD = 2CD.

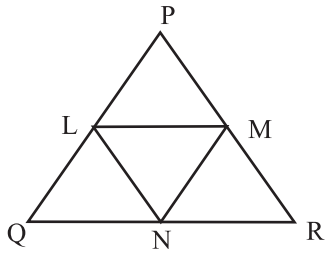


45. In the adjoining figure if PQRS is a parallelogram where $\angle PQR = 100$ and $\angle SPR = 40$. Find $\angle PRQ$ and $\angle SRQ$.



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

47. In the given figure L, M, and N are mid point of the sides PQ, PR and QR respectively of ΔPQR. If PQ = 4.4cm, QR = 5.6 cm and PR = 4.8cm then find the perimeter of ΔLMN.



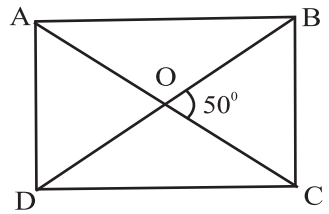
48. A quadrilateral is a parallelogram if one pair of opposite sides are equal and parallel. Prove it.

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

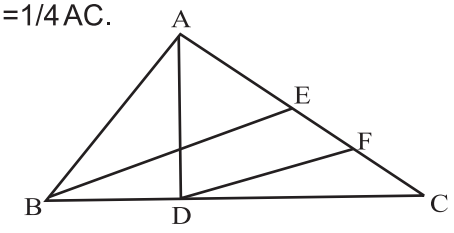
50. In a parallelograms PQRS, M and N are points on PQ and RS such that PM = RN. Prove that MS II NQ.

51. In a parallelogram ABCD, AP and CQ are drawn perpendiculars from vertices A and C on diagonal BD. Prove that $\Delta APB \cong \Delta CQD$.

52. The diagonals of a rectangle ABCD meet at O. If $\angle BOC = 50°$ then find $\angle ODA$.

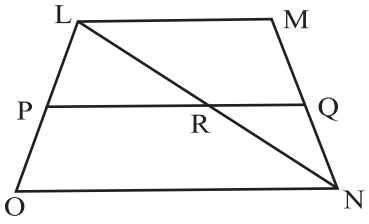


53. In the given figure AD and BE are the medians of ΔABC and BE || DF prove that CF =1/4 AC.



Part – D

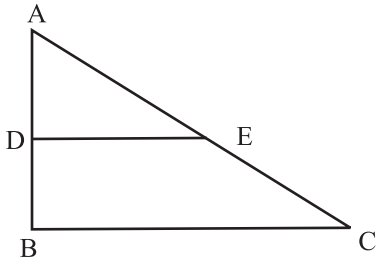
54. In the figure LMNO, is a trapezium in which LM is parallel to side ON and P is the mid point of side LO. If Q is a point on the side MN such that segment PQ is parallel to side ON Prove that Q is the mid point of MN and PQ = 1/2 (LM + ON).



55. 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



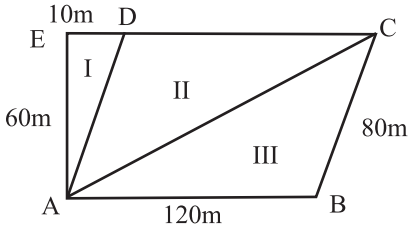
56. A farmer has divided his field into three parts as in the figure. Ist part is used to take care of his cattles. While II and III are used to grow two different crops.

    Answer the following :–

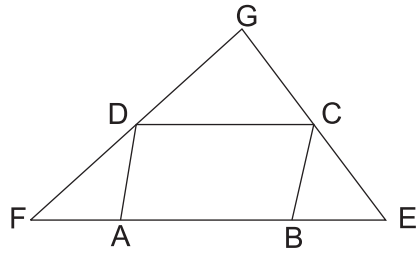
    i) How much area has been used to take care for cattles ?

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

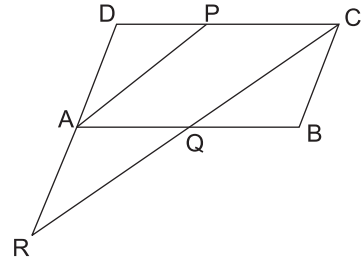
    iii) What is the total area of the field ?



57. ABCD is a parallelogram. Side AB is produced on both sides to E & F as in figure such that BE = BC & AF = AD. Show that EC & FD when produced meets at right angle.



58. P is mid point of side CD of a parallelogram ABCD. A line through C parallel to PA intersects AB at Q & DA produed at R. Prove that DA = AR & CQ = QR.



CHAPTER-8

QUADRILATERALS

ANSWERS

1. d) 120°
2. c) 50°
3. a) Parallelogram
4. b) Parallelogram
5. c) 38°
6. a) 60°, 80°, 100°, 120°
7. c) Half
8. d) 96
9. d) 18
10. b) 18
11. c) The opposite angles are congruent
12. a) 90°
13. b) A Triangle
14. c) Supplementary
15. a) 90°
16. d) 72°
17. c) Are Perpendicular to each other
18. a) 40°
19. c) Rhombus
20. c) 60°, 120°
21. (a) T (b) F (c) T (d) F (e) F (g) F
22. 120°, 60°, 120°
23. 30°, 60°, 120°, 150°
24. 100°
25. Rectangle
26. 115°
27. 5 cm
28. 65°
29. 200°
30. 108°, 72°, 108°, 72°
31. 100°, 80°, 100°, 80°

32. Prove
33. Prove
34. 70°, 110°
35. $x = y = 4$
36. Prove
37. 3.7cm, 3.1cm
38. 72°, 108°, 72°, 108°
39. 145°
40. 5.5cm
41. 6.3cm, 4.7cm
42. 20x units
43. $x = 60°$
44. Prove
45. 40°-80°
46. Prove
47. 7.4cm
48. Prove
49. Prove
50. Prove
51. Prove
52. 65°
53. Prove
54. Prove
55. 12cm, 40.5cm^2
56. (i) 300 m^2
    (ii) Yes
    (iii) 7500 m^2
57. Prove
58. Prove

PRACTICE TEST

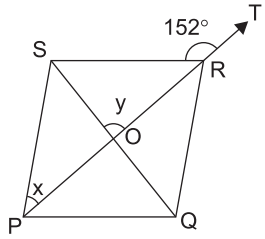
Time : 50 Min. **Quadrilaterals** M.M. 20

1. If the diagonals of a quadrilateral ABCD bisect each other & $\angle A = 45°$, what is m $\angle B$? (1)

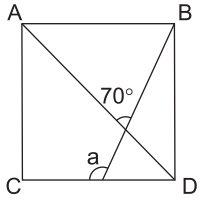
2. The angles of a Quadrilateral ABCD are in the ratio 2 : 3 : 5 : 8. Find the measure of smallest angle. (1)

3. In a ΔPQR, median PS is produced to a point T such that PS = ST. Prove that PQTR is a parallelogram. (2)

4. In the Fig. PQRS is a rhombus in which the diagonal PR is produced to T. If $\angle SRT = 152°$, find x & y. (2)



5. ABCD is a square. A line BM intersects CD at M and the diagonal AC at O such that $\angle AOB = 70°$, find a (3)



6. AD is median of ΔABC & E is the mid point of AD. BE is produced to meet AC in F. Prove that AF = 1/3 AC. (3)

7. Show that the bisectors of angles of a parallelogram forms a rectangle. (4)

8. Show that the quadrilateral formed by joining the mid point of the sides of a square is also a square. (4)