Areas of Parallelograms

Write True or False and justify your answer :

1) ABCD is a parallelogram and X is the mid-point of AB. If ar (AXCD) = 24 cm^2, then ar (ABC) = 24 cm^2.

2) PQRS is a rectangle inscribed in a quadrant of a circle of radius 13 cm. A is any point on PQ. If PS = 5 cm, then ar (PAS) = 30 cm^2.

3) PQRS is a parallelogram whose area is 180 cm^2 and A is any point on the diagonal QS. The area of Δ ASR = 90 cm^2.

4) ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Then ar (BDE) = $\frac{1}{4}$ ar (ABC).

5) In Fig. 9.8, ABCD and EFGD are two parallelograms and G is the mid-point of CD. Then ar (DPC) = $\frac{1}{2}$ ar (EFGD).

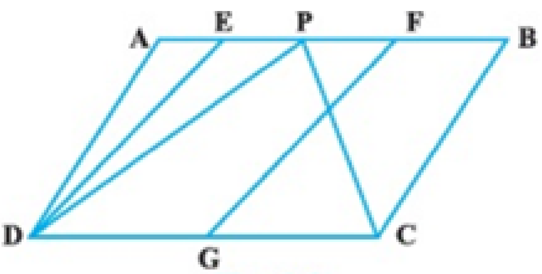

Fig. 9.8

6) In Fig.9.11, PSDA is a parallelogram. Points Q and R are taken on PS such that PQ = QR = RS and PA ∥ QB ∥ RC. Prove that ar (PQE) = ar (CFD).

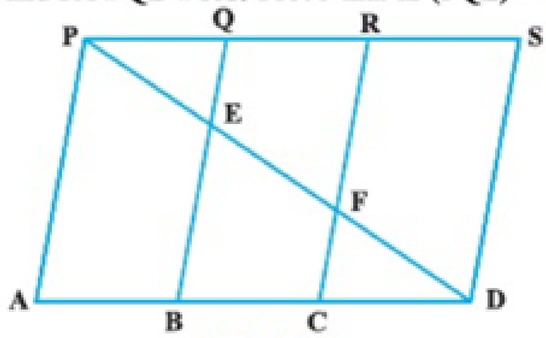

Fig. 9.11

7) X and Y are points on the side LN of the triangle LMN such that LX = XY = YN. Through X, a line is drawn parallel to LM to meet MN at Z (See Fig. 9.12). Prove that

ar (LZY) = ar (MZYX)

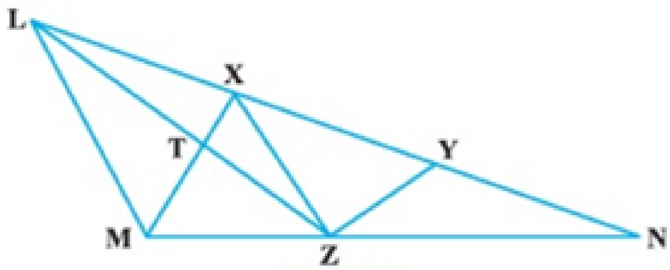

Fig. 9.12

8) The area of the parallelogram ABCD is 90 cm^2 (see Fig.9.13). Find

(i) ar (ABEF)

(ii) ar (ABD)

(iii) ar (BEF)

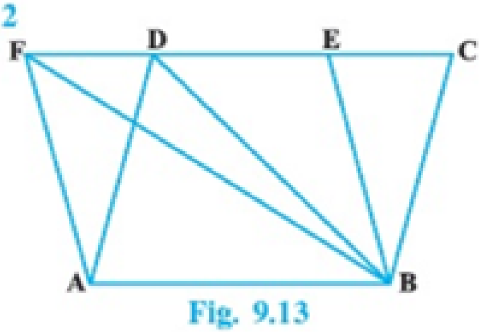

Fig. 9.13

9) In Δ ABC, D is the mid-point of AB and P is any point on BC. If CQ || PD meets AB in Q (Fig. 9.14), then prove that

$$ar\ (BPQ) = \frac{1}{2}\ ar\ (ABC).$$

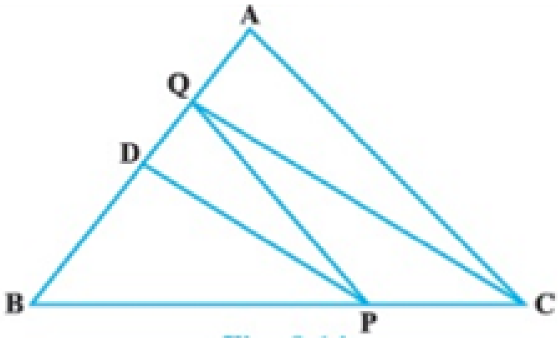

Fig. 9.14

10) ABCD is a square. E and F are respectively the mid-points of BC and CD. If R is the mid-point of EF (Fig. 9.15), prove that
ar (AER) = ar (AFR)

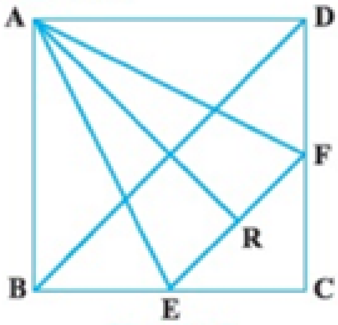

Fig. 9.15

11) O is any point on the diagonal PR of a parallelogram PQRS (Fig. 9.16). Prove that ar (PSO) = ar (PQO).

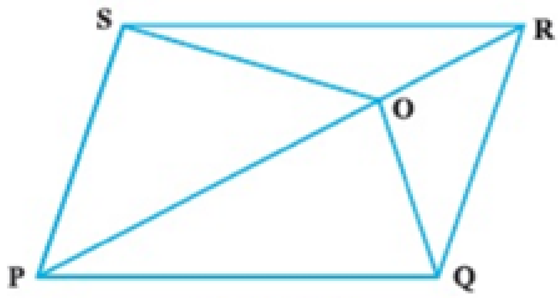

Fig. 9.16

12) ABCD is a parallelogram in which BC is produced to E such that CE = BC (Fig. 9.17). AE intersects CD at F.
If ar (DFB) = 3 cm^2, find the area of the parallelogram ABCD.

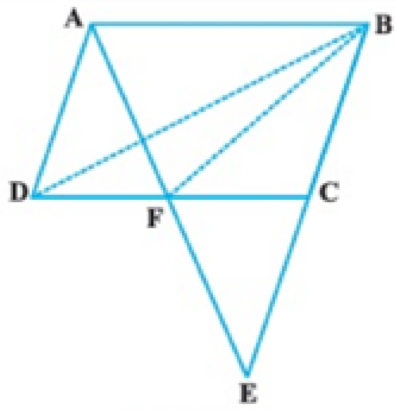

Fig. 9.17

13) In trapezium ABCD, AB || DC and L is the mid-point of BC. Through L, a line PQ || AD has been drawn which meets AB in P and DC produced in Q (Fig. 9.18). Prove that

ar (ABCD) = ar (APQD)

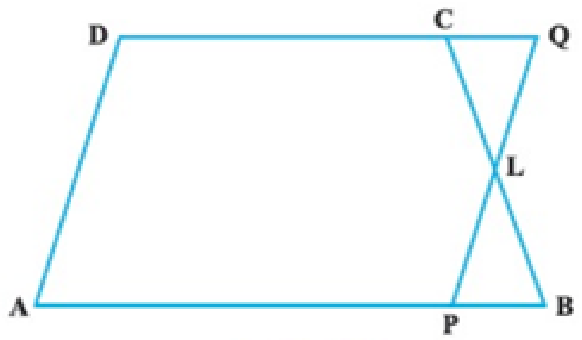

Fig. 9.18

14) If the mid-points of the sides of a quadrilateral are joined in order, prove that the area of the parallelogram so formed will be half of the area of the given quadrilateral (Fig. 9.19).

[Hint: Join BD and draw perpendicular from A on BD.]

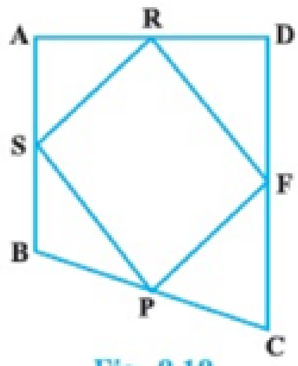

Fig. 9.19

15) A point E is taken on the side BC of a parallelogram ABCD. AE and DC are produced to meet at F. Prove that

ar (ADF) = ar (ABFC)

16) The diagonals of a parallelogram ABCD intersect at a point O. Through O, a line is drawn to intersect AD at P and BC at Q. Show that PQ divides the parallelogram into two parts of equal area.

17) The medians BE and CF of a triangle ABC intersect at G. Prove that the area of Δ GBC = area of the quadrilateral AFGE.

18) In Fig. 9.24, CD || AE and CY || BA. Prove that

ar (CBX) = ar (AXY)

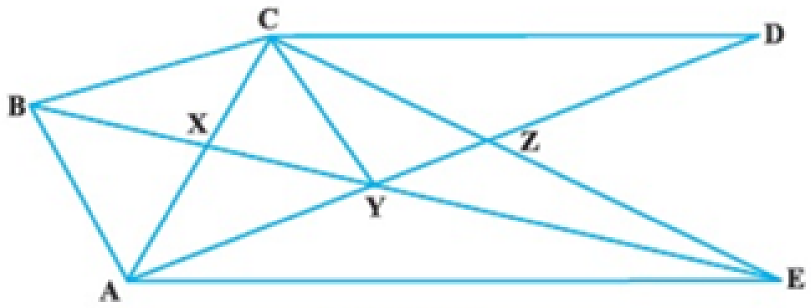

Fig. 9.24

19) ABCD is a trapezium in which AB || DC, DC = 30 cm and AB = 50 cm. If X and Y are, respectively the mid-points of AD and BC, prove that

$$\text{ar (DCYX)} = \frac{7}{9} \text{ ar (XYBA)}$$

20) In Δ ABC, if L and M are the points on AB and AC, respectively such that LM || BC. Prove that ar (LOB) = ar (MOC)

21) In Fig. 9.25, ABCDE is any pentagon. BP drawn parallel to AC meets DC produced at P and EQ drawn parallel to AD meets CD produced at Q. Prove that

ar (ABCDE) = ar (APQ)

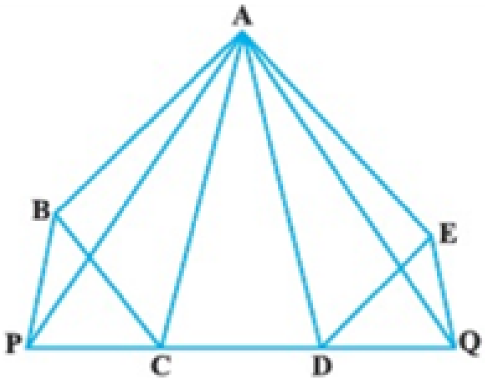

Fig. 9.25

22) If the medians of a ΔABC intersect at G, show that
ar (AGB) = ar (AGC) = ar (BGC)

$= \frac{1}{3}$ ar (ABC)

23) In Fig. 9.26, X and Y are the mid-points of AC and AB respectively, QP ∥ BC and CYQ and BXP are straight lines. Prove that ar (ABP) = ar (ACQ).

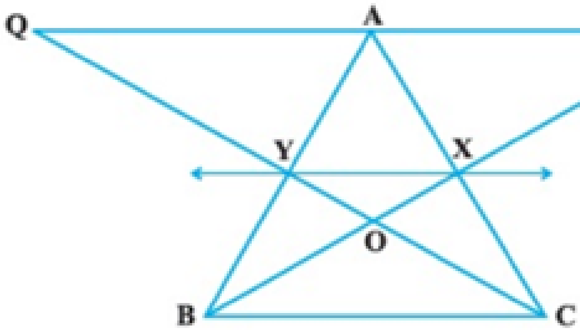

Fig. 9.26

24) In Fig. 9.27, ABCD and AEFD are two parallelograms. Prove that ar (PEA) = ar (QFD) [**Hint:** Join PD].

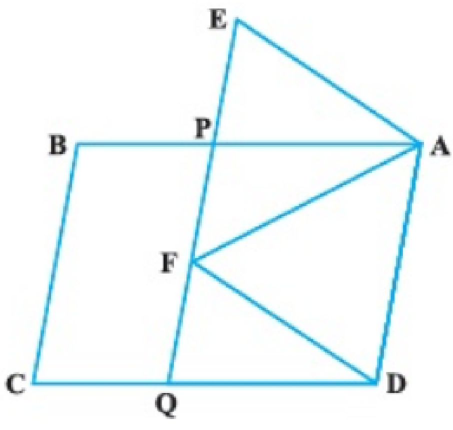

Fig. 9.27