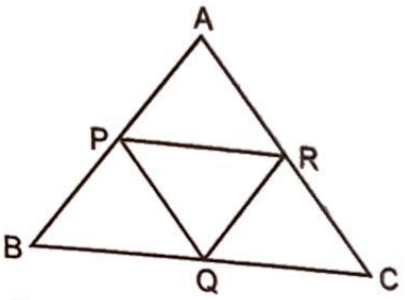
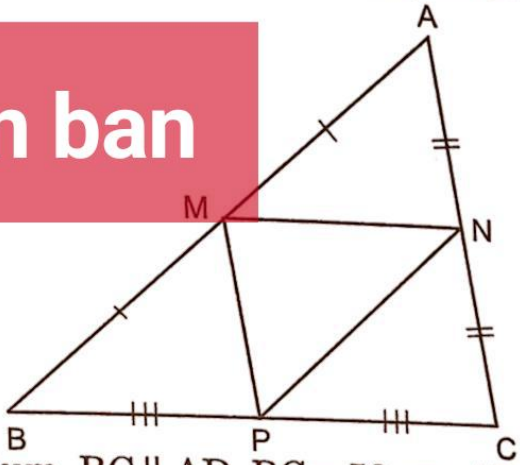
Exercise 2.2

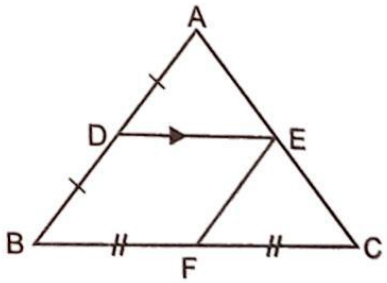
1. Prove that the line segments joining the mid-points of any two sides of a triangle, is parallel to the third side and equal to half of it.
2. In ΔABC, AB = 6 cm and AC = 3 cm. If M is the mid point of AB, and a straight line through M parallel to BC cuts AC in N, what is the length of AN?
3. In the given figure, P, Q, R are the mid-points of AB, BC and AC respectively. If AB = 10 cm, BC = 8 cm and AC = 12 cm, find the perimeter of ΔPQR.



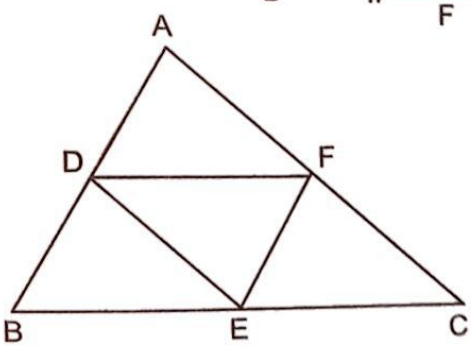
4. In the following figure, M, N and P are mid-points of AB, AC and BC respectively. If MN = 3 cm, NP = 3.5 cm and MP = 2.5 cm, calculate BC, AB and AC.



5. ABCD is a trapezium, BC || AD, BC = 50 cm, AD = 80 cm. E and F are the mid-points of non-parallel sides of ABCD respectively. Prove that EF || BC and find the length of EF.
6. In the given figure, D is the mid-point of AB and F is the mid-point of BC. Prove that EF = DB.



7. In the given figure, D, E and F are respectively the mid-points of the sides AB, BC and CA of ΔABC. Prove that BDFE is a parallelogram.

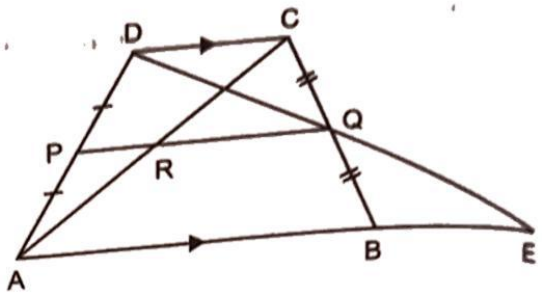


8. In the given figure, ABCD is a trapezium in which AB || DC and P, Q are the mid-points of AD and BC respectively. DQ and AB when produced meet at E. Prove that

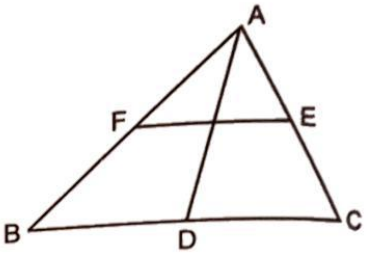
(*i*) DQ = QE

(*ii*) PR || AB

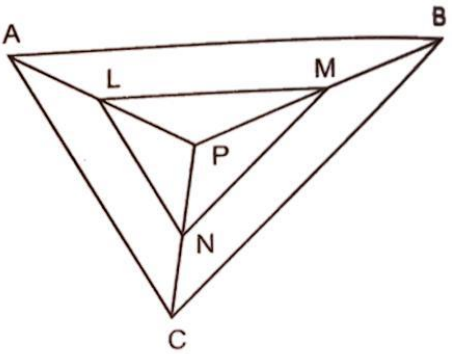
(*iii*) AR = RC



9. In the given figure, D, E, F are the mid-points of BC, CA and AB respectively. Prove that AD bisects EF.



10. ABC is a triangle. D is a point on AB such that $AD = \frac{1}{4}AB$ and E is a point on AC such that $AE = \frac{1}{4}AC$. Prove that $DE = \frac{1}{4}BC$.

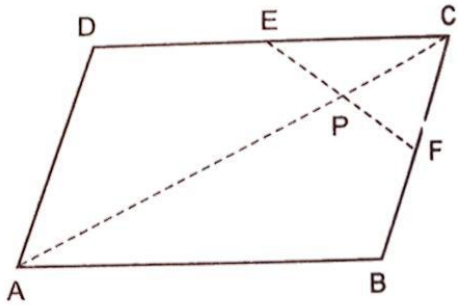


11. In the given figure, L, M, N are the mid-points of AP, BP and CP respectively. Prove that ΔABC and ΔLMN are equi-angular.

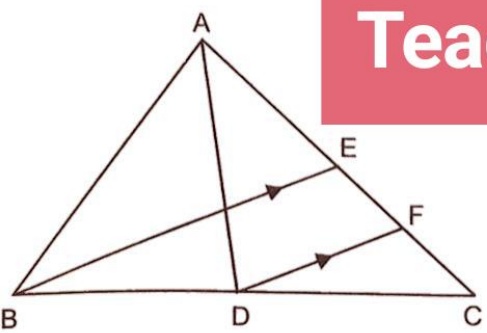
12. In the given figure, ABCD is a parallelogram. E is the mid-point of CD and P is a point on AC such that $PC = \frac{1}{4}AC$. EP produced meets BC at F. Prove that

(*i*) F is the mid-point of BC.

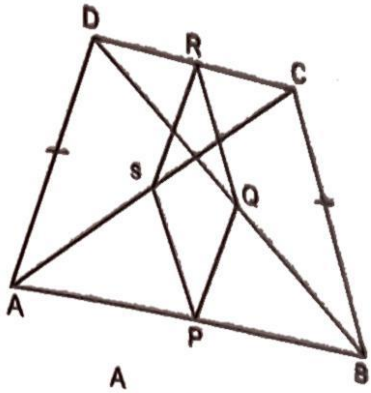
(*ii*) 2EF = BD



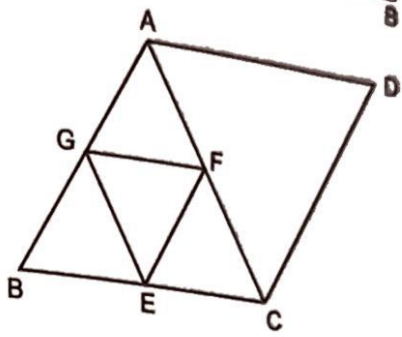
13. In the given figure, AD and BE are medians of ΔABC and BE || DF. Prove that $CF = \frac{1}{4}AC$.



14. In the given figure, ABCD is a quadrilateral in which AD = BC and P, Q, R, S are the mid-points of AB, BD, CD and AC respectively. Prove that PQRS is a rhombus.



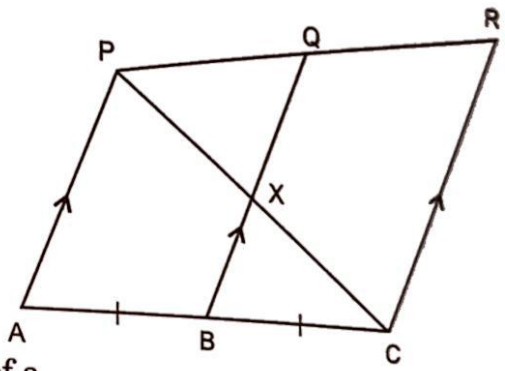
15. In the given figure, ABCD is a parallelogram in which AC is a diagonal. G, E and F are the mid-points of AB, BC and AC respectively. If ΔGEF is an equilateral triangle, then prove that parallelogram ABCD is a rhombus not square.



16. From the given figure, prove that

(*i*) $BX = \frac{1}{2} AP$.

(*ii*) $AP + CR = 2BQ$.

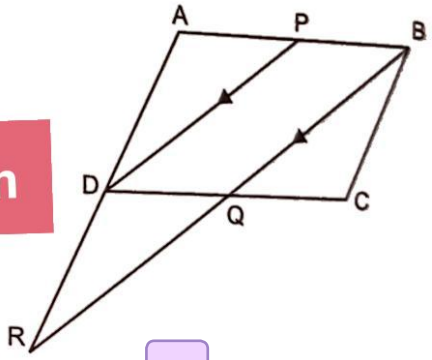


17. P is the mid-point of the side AB of a parallelogram ABCD. A line through B parallel to PD meets DC at Q and AD produced at R.

Prove that

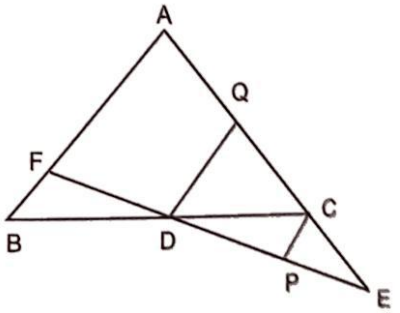
(*i*) AR = 2BC

(*ii*) BR = 2BQ



18. In a triangle ABC, BM and CN are perpendiculars from B and C respectively on any line passing through A. If L is the mid-point of BC, prove that LM = LN.

19. In the given figure, the side AC of a ΔABC is produced to E such that $CE = \frac{1}{2} AC$. If D is the mid-point of BC and ED produced meets AB at F and CP, DQ are drawn parallel to BA. Prove that $FD = \frac{1}{3} FE$.



Answers

2. 1.5 cm

3. 15 cm

4. BC = 6cm, AB = 7cm, AC = 5cm

5. EF = 65 cm