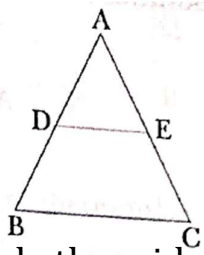
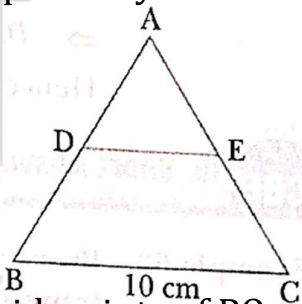
QUADRILATERAL

✣ Very Short Answer Question (VSAQs)

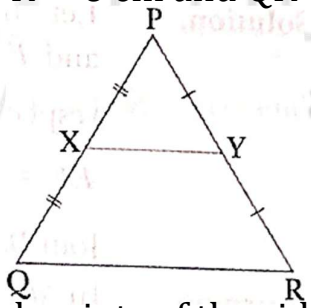
Q1. If D and E are respectively the midpoints of the sides AB and AC of ΔABC in which AB = 7.2 cm, BC = 9.8 cm and AC = 3.5 cm, then determine the length of DE.



Q2 In the figure, if D and E are respectively the mid points of AB and AC, what will be the length of ED?

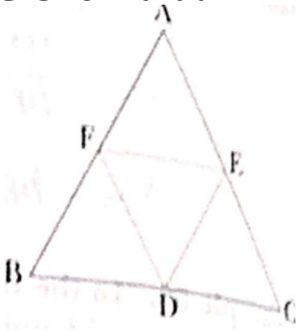


Q3. In the figure, X and Y are the mid-points of PQ and PR respectively. Given PQ = 6.4 cm, PR = 6 cm and QR = 7 cm. Calculate the perimeter Of trapezium XQRY.



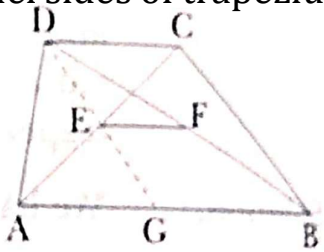
Q4. D, E and F are the mid-points of the sides BC, CA and AB respectively of an equilateral ΔABC. Show that ΔDEF is also an equilateral triangle.

[NCERT EXEMPLAR]



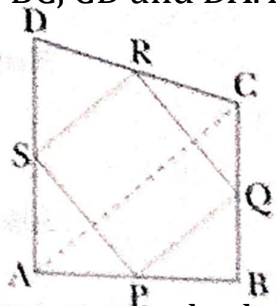
✣ <u>Short Answer Questions (Constructed Response Questions)</u>

Q5. Prove that the line segment joining the mid-points of the diagonals of a trapezium is parallel to the parallel sides of trapezium and is equal to half the difference of these sides.



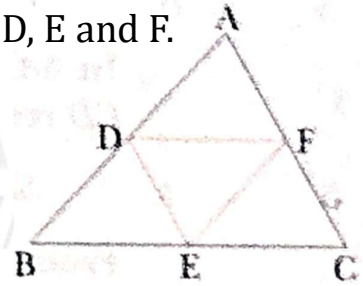
Q6. In the figure, ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal. Show that PQRS is a parallelogram.

[NCERT]



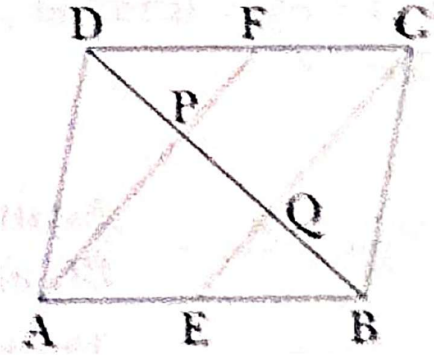
Q7. In ABC, D, E and F are respectively the mid-points of sides AB, BC and CA (see figure). Show that AABC is divided into four congruent triangles by joining D, E and F.

[NCERT]

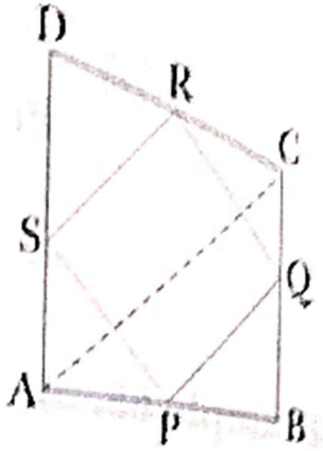


Q8. In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively. Show that the line segments AF and EC trisect the diagonal BD.

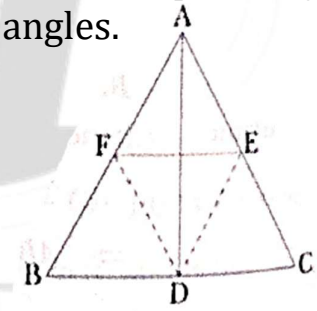
[NCERT]



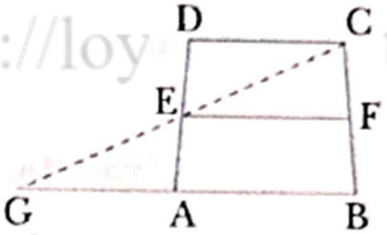
Q9. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other.



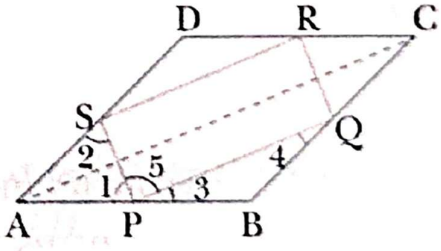
Q10. ABC is an isosceles triangle with AB = AC, and D, E, F are the mid-points of the sides BC, CA, AB respectively. Show that AD and FE bisect each other at right angles.



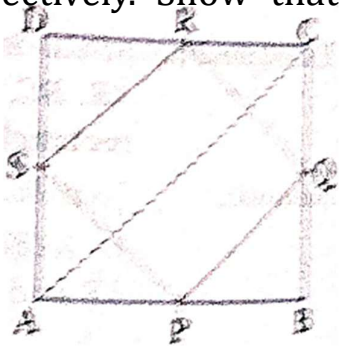
Q11. E and F are respectively the mid-points of non-parallel sides AD and BC of a trapezium ABCD. Prove that EF || AB and EF = ½ (AB + CD).



Q12. 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.



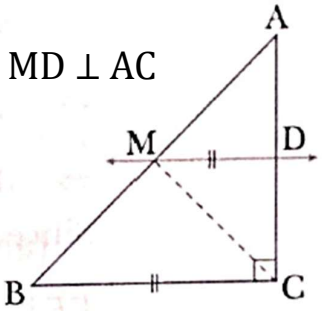
Q13. ABCD is a rectangle and P,Q,R and S are mid-point of the sides AB, BC, CD, and DA respectively. Show that the quadrilateral PQRS is a rhombus. (NCERT)



Q14. ΔABC is a right angled triangle with the right angle at C, and a line through the midpoint M of the hypotenuse AB is parallel to BC, intersecting AC at D, prove that

(i) D is the mid-point of AC. (ii) MD ⊥ AC

(iii) CM = MA = 1/2 AB.

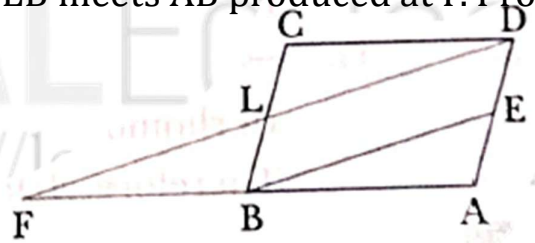


Q15. In the adjoining figure, ABCD is a parallelogram and E is the mid-point of AD. DL || EB meets AB produced at F. Prove that:

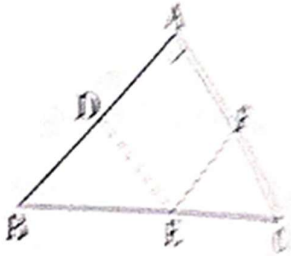
(i) AF = 2DC

(ii) DF = 2DL

(iii) BE = FL



Q16. ΔABC is an isosceles right angled triangle such that ∠A = 90°, at AB = AC. If D, E and F are mid-points of the sides AB, BC and AC respectively, then prove that quadrilateral ADEF is a square.



CBE VI. Case Study Based Os (Competency Focused & Inference Based Qs)

Q17. On the occasion of a festival, girls of a class were asked to prepare Rangoli in a triangular shape. They made a Rangoli in the shape of triangle ABC as shown. The lengths of sides of ABC are AC = 25 cm, BC = 28 cm, AB = 25 cm.

Q18. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rhombus, if

(a) PQRS is a rhombus. (b) PQRS is a parallelogram.
(c) diagonals of PQRS are perpendicular
(d) diagonals of PQRS are equal.

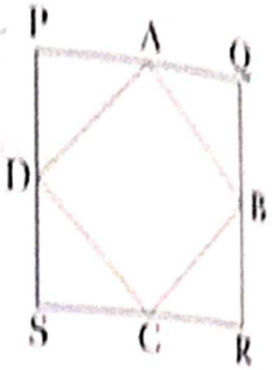
Q19. The quadrilateral formed by joining the mid-points of the pair of consecutive sides of a quadrilateral PQRS, taken in order, is a rectangle, if

(a) PQRS is a rectangle. (b) PQRS is a parallelogram.
(c) diagonals of PQRS are perpendicular.
(d) diagonals of PQRS are equal.

[NCERT Exemplar]

Q20. Points A, B, C, D are midpoints of the sides of square PQRS. If the area of PQRS is 36 sq. cm, the area of ABCD is:

(a) $9\sqrt{2}$ sq. cm (b) $18\sqrt{2}$ sq. cm
(c) 9 sq. cm (d) 18 sq. cm



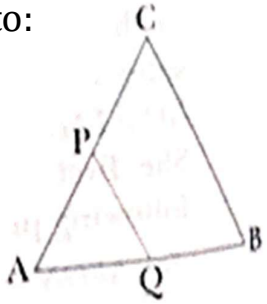
Q21. D and E are mid-points of the sides AB and AC of AABC and O is any point on the side BC. O is joined to A. If P and Q are mid-points of OB and OC respectively, then DEQP is:

(a) a square (b) a rectangle (c) a rhombus
(d) a parallelogram

Q22. The figure formed by joining the mid-points of the sides of a quadrilateral ABCD, taken in order, is a square only if
(a) ABCD is a rhombus.
(b) diagonals of ABCD are equal.
(c) diagonals of ABCD are perpendicular to each other.
(d) diagonals of ABCD are equal and perpendicular to each other.

Q23. ABCD is a parallelogram and E is the mid-point of BC. DE and AB when produced meet at F, then AF / AB
(a) 5/3 (b) 7/3 (c) 2 (d) 2/3

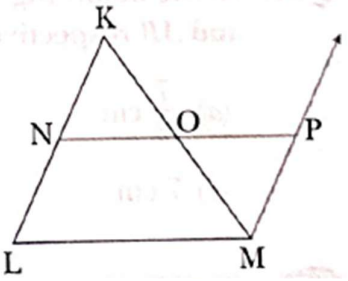
Q24. In the adjoining figure, P and Q are the mid-points of AC and AB respectively if PQ = 7 cm. Then CB is equal to:
(a) 7/2 cm (b) 14 cm
(c) 7 cm (d) 7/4 cm



I(b). Select Response Questions (MCQs)

Q25. ABC is a triangular plot of land, if D and E are mid point of AB and AC. Which of the following statement/statements is/are true?
(i) DE divides the plot into two smaller congruent triangular.
(ii) DE divides the plot into two parts.
(iii) DE = AB
(iv) DE || BC
Choose the correct option from the following:
(a) (i) and (ii) (b) Only (iii)
(c) (i) and (iv) (d) Only (i)

Q26. In the figure shown, points N and O are midpoints of sides of KL and KM of ΔKLM. Ananya wants to prove NO || LM. She constructs a ray MP such that KL || MP. She first proves ΔKON ≅ ΔMOP. Which of the following justifies her step of proof?



Q27. The diagonals SR and UE of a rectangle SURE intersect each other at O. If ∠SUE = 50°, then which of the following statement are true?

(i) The value of ∠ROE is 80°.
(ii) The value of ∠OSU is 80°.
(iii) The value of ∠SRE is 50°.
(iv) The value of ∠ESR is 40°.

Choose the correct option from the following:

(a) (i) and (ii) (b) (i) and (iii)
(c) (i), (ii) and (iv) (d) (i), (ii) and (iv)

CBE II. Competency Focused & Inference Based Questions (A-R)

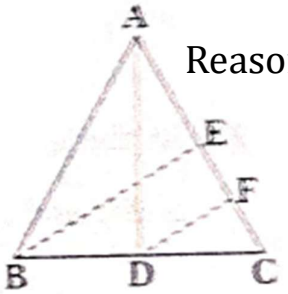
The following questions are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Q 30. Assertion (A) : A parallelogram consists of two congruent triangles.

Reason (R) : Diagonal of a parallelogram divides it into two congruent triangles.

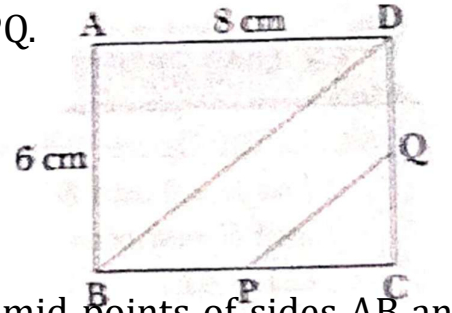
Q 31. Assertion (A) : In figure if AD and BE are medians of ΔABC such that BE || DF, then CF = 1/4 AC



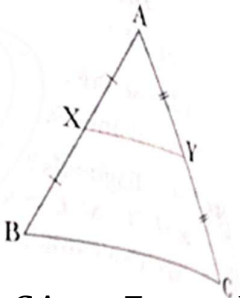
Reason (R) : The line drawn through the mid-point of one side of a triangle, parallel to another side, intersects the third side at its mid-point.

III. Very Short Answer Questions (VSAQs)

Q 32. In the adjoining figure, ABCD is a rectangle in which AB = 6 cm and AD = 8 cm. If P and Q are mid-points of the sides BC and CD respectively, then find the length of PQ.

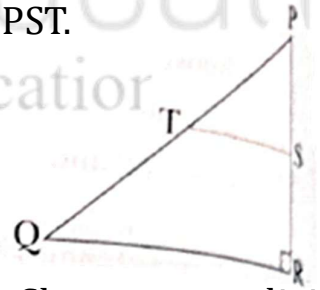


Q33. In the adjoining figure, X and Y are mid-points of sides AB and AC respectively of ΔABC. If BC = 6 cm, AB = 7.4 cm and AC = 6.4 cm, then find the perimeter of trapezium XBCY.



Q34. In ΔABC, AB = 5 cm, BC = 8 cm and CA = 7 cm. If D and E are respectively the mid- points of AB and BC, determine the length of DE.

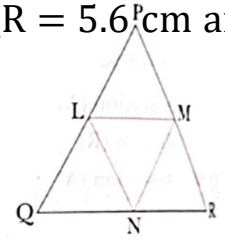
Q35. In the right ΔPQR, T is the midpoint of PQ and TS || QR. If QR = 16 cm, RP = 12 cm, then, find the area of ΔPST.



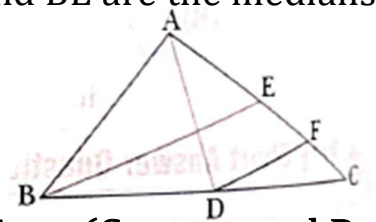
Q36. Sanya has a triangular piece of land. She wants to divide it into four equal areas. Suggest a way to do so.

CBE IV. Short Answer Questions (Constructed Response Questions)

Q37. In the given figure L, M and N are mid point of the sides PQ, PR and QR of ΔPQR respectively. If PQ = 4.4 cm, QR = 5.6 cm and PR = 4.8 cm, then find the perimeter of ΔLMN.

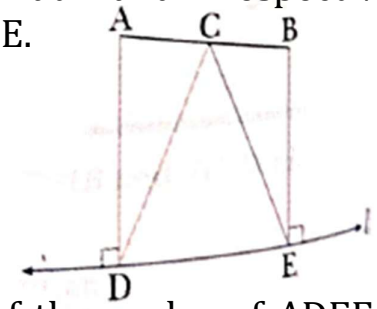


Q38. In the given figure AD and BE are the medians of ΔABC and BE || DF. Prove that CF = 1/4 AC.

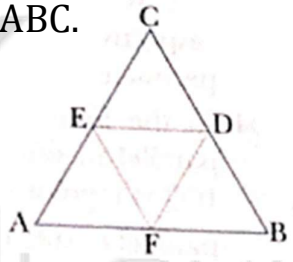


CBE V. Long Answer Questions (Constructed Response Questions)

Q39. In the figure, points A and B are on the same side of a line l, AD and BE are perpendicular to l, meeting l at D and E respectively. C is the mid-point of AB. Prove that CD = CE.

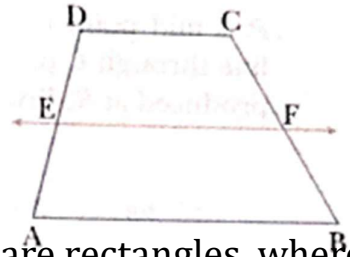


Q40. In the figure, find the measures of the angles of ΔDEF formed by joining the mid-points of the sides of ΔABC.



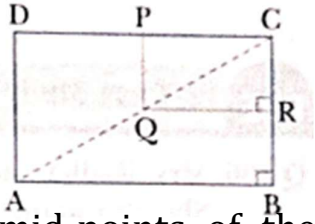
Q41. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a square is also a square.

Q42. In the adjoining figure, ABCD is a trapezium in which AB || DC and E is mid-point of AD. A line is drawn through E parallel to AB intersecting BC at F. Show that F is mid-point of BC.



Q43. In adjoining figure, ABCD and PQRC are rectangles, where Q is the midpoint of AC. Prove that

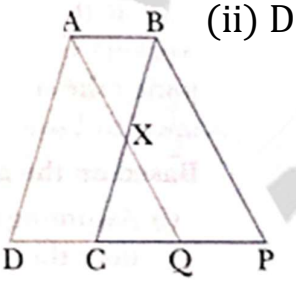
(i) DP = PC (ii) PR = 1/2 AC



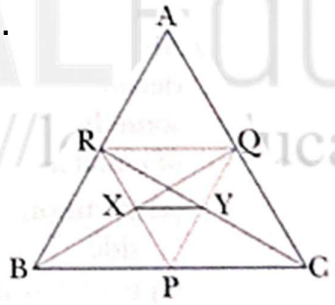
Q44. P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively of a quadrilateral ABCD in which AC ⊥ BD. Prove that PQRS is a rectangle.

Q45. In the adjoining figure, ABCD is a parallelogram and X is mid-point of BC. Produce the line segment AX to meet DC produced at Q. The parallelogram ABPQ is completed. Prove that:

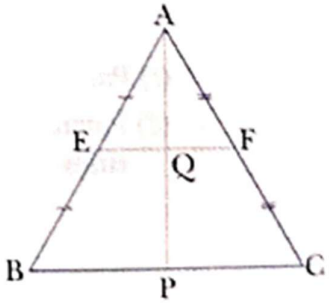
(i) $\Delta ABX \cong \Delta QCX$ (ii) $DC = CQ = QP$.



Q46. In the given figure, P, Q and R are mid-points of sides BC, AC and AB respectively of ΔABC. PR and BQ meet at X. CR and PQ meet at Y. Prove that $XY = 1/4\ BC$.

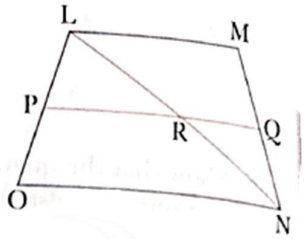


Q47. In the figure, E and F are mid-points of sides AB and AC respectively of ΔABC. P is any point on BC. Prove that EF bisects AP.

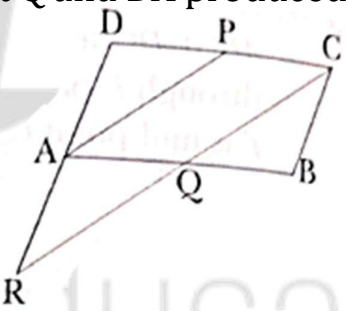


Q48. ABC is a triangle and through A, B, C, lines are drawn parallel to BC, CA and AB respectively intersecting at Q, P and R. Prove that the perimeter of ΔPQR is double the perimeter of ΔABC.

Q49. 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).



Q50. P is mid-point of side CD of a parallelogram ABCD. A line through C parallel to PA intersects AB at Q and DA produced at R. Prove that DA = AR and CQ = QR.



VI. Case Study Based Qs (Competency Focused & Inference Based Qs)

Q51. Mrs. Radha had a rectangular patch of land in her farmhouse to be used as a lawn. She also wants a part of the land to be used for planting trees and have sitting areas. She tells her workers to mark the midpoints of each side of the rectangular patch and use the area obtained by joining the midpoints for creating the lawn. At two opposite corners of the rectangular patch, she decides to have sitting areas with big shady trees. And at the other two opposite corners, she decided to have ornamental plants. The workers fixed small poles to mark out the midpoints of the rectangular patch. They joined the consecutive midpoints with multi-coloured pebbles to fix the boundary of the lawn and sow grass seeds in that area.

Based on the above information, answer the following questions:

(i) Assuming the grass growth is uniform throughout, after a few months, what shape does the grass lawn look like?

(a) Rectangle (b) Square

(c) Rhombus (d) Trapezium

(ii) Also, there is a rectangular patch of land unutilised in the backyard. Mrs. Radha decides to use the patch as a vegetable garden, but her daughter insists on growing some herbs too. Which partitioning described below does not satisfy the criterion of equal area allocation for both the purposes?

(a) Partition the land by imaginary line connecting the mid-point of the longer side.

(b) Partition the land by imaginary line connecting the mid-point of the shorter side.

(c) Partition the land by imaginary line connecting one pair of opposite vertices.

(d) Partition the land by imaginary line connecting the mid-points of adjacent sides.

[CBSE Practice Problem]

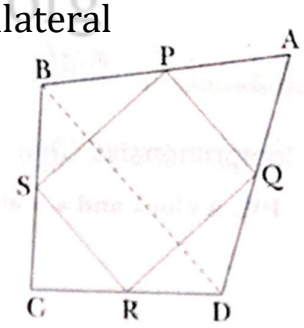
Q52. The class teacher of Class IX gave students coloured papers made by recycling of waste products in shape of quadrilateral. She asked them to make a parallelogram by folding the papers.
Then teacher ask them some questions. To answer these questions, choose the correct options.
How can a parallelogram be formed by using paper folding?

(a) Joining the sides of quadrilateral

(b) Joining the mid-points of sides of quadrilateral

(c) Joining the vertices of quadrilateral

(d) None of the above



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