

CHAPTER TEST: AREAS OF PARALLELOGRAMS AND TRIANGLES

Mathematics | Class IX (2026/ARPARA/09/003)

Time: 1.5 Hours

Max. Marks: 40

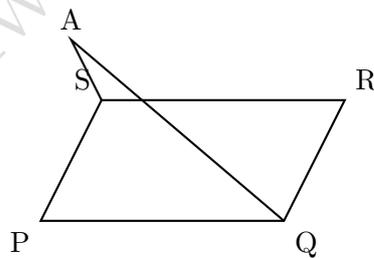
General Instructions:

- All questions are compulsory.
- Section A: 8 MCQs (1 mark each).
- Section B: 4 Very Short Answer Questions (2 marks each).
- Section C: 3 Short Answer Questions (3 marks each).
- Section D: 2 Long Answer Questions (5 marks each).
- Section E: 1 Case Study with 5 MCQs (1 mark each).

Section A: Multiple Choice Questions (1 Mark Each)

1. $ABCD$ is a parallelogram and P is any point in its interior. If $area(ABCD) = 40 \text{ cm}^2$, then $area(\triangle APB) + area(\triangle CPD)$ is:
 - (a) 10 cm^2
 - (b) 20 cm^2
 - (c) 30 cm^2
 - (d) 40 cm^2
2. If a triangle and a parallelogram are on the same base and between the same parallels, and the area of the triangle is 24 cm^2 , what is the area of the parallelogram?
 - (a) 12 cm^2
 - (b) 24 cm^2
 - (c) 48 cm^2
 - (d) 72 cm^2
3. In $\triangle ABC$, E is the mid-point of median AD . If $area(\triangle BED) = 5 \text{ cm}^2$, then $area(\triangle ABC)$ is:
 - (a) 10 cm^2
 - (b) 15 cm^2
 - (c) 20 cm^2
 - (d) 25 cm^2
4. Two triangles have equal areas and they lie on the same base. Which of the following must be true?
 - (a) They are congruent.
 - (b) They lie between the same parallels.

- (c) They are right-angled.
 (d) Their perimeters are equal.
5. In parallelogram $ABCD$, $AB = 10\text{ cm}$. The altitudes corresponding to sides AB and AD are 7 cm and 8 cm respectively. The length of AD is:
- (a) 8.75 cm
 (b) 9 cm
 (c) 10.25 cm
 (d) 11 cm
6. The figure obtained by joining the mid-points of the adjacent sides of a rectangle of sides 8 cm and 6 cm is a rhombus. Its area is:
- (a) 48 cm^2
 (b) 24 cm^2
 (c) 12 cm^2
 (d) 36 cm^2
7. D, E, F are the mid-points of the sides BC, CA and AB of $\triangle ABC$. The ratio $\text{area}(DEF) : \text{area}(ABC)$ is:
- (a) $1 : 2$
 (b) $1 : 3$
 (c) $1 : 4$
 (d) $2 : 3$
8. In the given figure, if $\text{area}(PQRS) = 80\text{ cm}^2$, then $\text{area}(AQS)$ is:

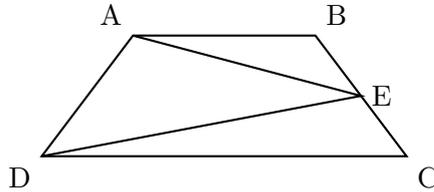


- (a) 80 cm^2
 (b) 40 cm^2
 (c) 20 cm^2
 (d) 60 cm^2

Section B: Very Short Answer Questions (2 Marks Each)

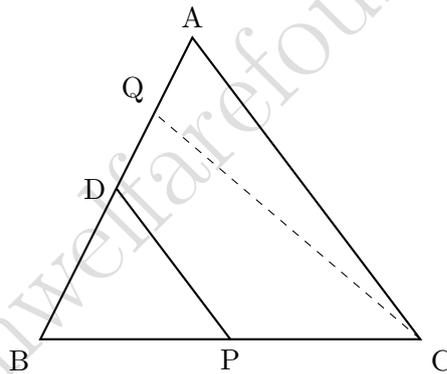
1. In $\triangle ABC$, D and E are points on BC such that $BD = DE = EC$. Show that $\text{area}(\triangle ABD) = \text{area}(\triangle ADE) = \text{area}(\triangle AEC)$.
2. $PQRS$ is a square. T and U are respectively the mid-points of PS and QR . Find the ratio of $\text{area}(\triangle PQT)$ to $\text{area}(PQRS)$.

3. Prove that the area of a rhombus is half the product of its diagonals using the concept of triangles.
4. In the given figure, $ABCD$ is a trapezium with $AB \parallel DC$ and $AB < DC$. If E is the mid-point of BC , prove that $area(\triangle ADE) = \frac{1}{2}area(ABCD)$.



Section C: Short Answer Questions (3 Marks Each)

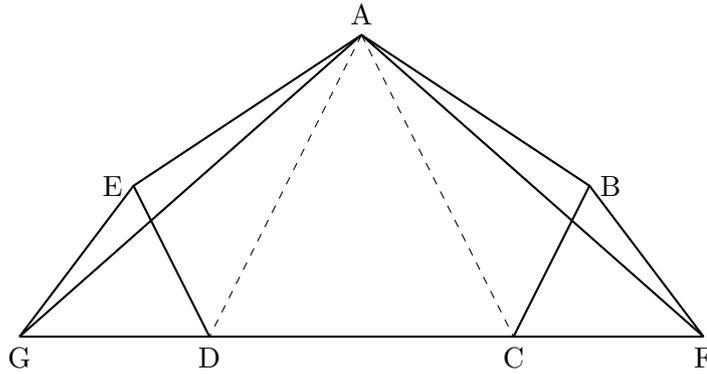
1. Diagonals AC and BD of a quadrilateral $ABCD$ intersect at O . If $area(\triangle OAB) = area(\triangle OCD)$, prove that $ABCD$ is either a trapezium or a parallelogram.
2. In the figure, D is the mid-point of side AB of $\triangle ABC$. P is any point on BC . If $CQ \parallel PD$ meets AB in Q , show that $area(\triangle BPQ) = \frac{1}{2}area(\triangle ABC)$.



3. Show that the area of a triangle formed by joining the mid-points of the sides of another triangle is one-fourth of the area of the given triangle.

Section D: Long Answer Questions (5 Marks Each)

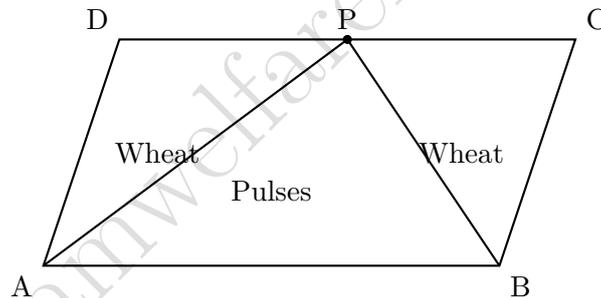
1. $ABCD$ is a parallelogram. L and M are points on AB and CD respectively such that $AL = CM$. Prove that LM and BD bisect each other. Also, prove that $area(ADML) = area(BCML)$.
2. In the given figure, $ABCDE$ is a pentagon. A line through B parallel to AC meets DC produced at F and a line through E parallel to AD meets CD produced at G . Show that $area(ABCDE) = area(\triangle AFG)$.



Section E: Case Study Based Questions (5 Marks)

Case Study:

A farmer has a large field in the shape of a parallelogram $ABCD$. He wants to divide a part of his land to grow two different crops: Wheat and Pulses. He takes a point P on the boundary CD and joins it to the corners A and B . This divides the field into three triangular regions. The farmer decides to use the middle triangular region $\triangle APB$ for growing pulses and the other two triangular regions $\triangle ADP$ and $\triangle BCP$ for growing wheat. The total area of the parallelogram field is 2400 m^2 . He is interested in understanding the distribution of area to manage the seeds and fertilizers effectively.



Questions (Choose the correct option):

- What is the area of the region allocated for Pulses ($\triangle APB$)?
 - 800 m^2
 - 1200 m^2
 - 1600 m^2
 - 600 m^2
- What is the total area of the regions allocated for Wheat?
 - 1200 m^2
 - 1800 m^2
 - 2400 m^2
 - 1000 m^2
- If the point P is the mid-point of CD , then the ratio of $area(\triangle ADP) : area(\triangle BCP)$ is:

- (a) 2 : 1
 - (b) 1 : 1
 - (c) 1 : 2
 - (d) 3 : 1
4. If the farmer moves point P further towards C along the line DC , the area of $\triangle APB$ will:
- (a) Increase
 - (b) Decrease
 - (c) Remain the same
 - (d) Become zero
5. The geometric theorem justifying the area of the Pulses region is:
- (a) Parallelograms on same base are equal in area.
 - (b) A median divides a triangle into two equal areas.
 - (c) Triangle and parallelogram on same base and between same parallels.
 - (d) Congruent triangles have equal areas.

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