CHAPTER TEST: AREAS OF PARALLELOGRAMS AND TRIANGLES

Mathematics | Class IX (2026/ARPARA/09/002)

Time: 1.5 Hours **Max. Marks: 40**

General Instructions:

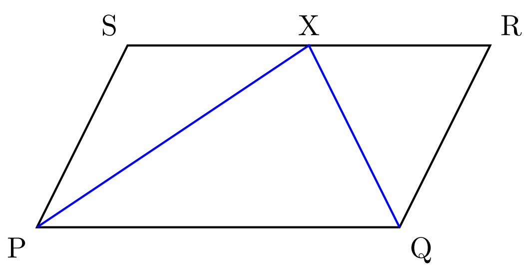
- All questions are compulsory.
- Section A: 8 MCQs (1 mark each).
- Section B: 4 Very Short Answer Questions (2 marks each).
- Section C: 3 Short Answer Questions (3 marks each).
- Section D: 2 Long Answer Questions (5 marks each).
- Section E: 1 Case Study with 5 MCQs (1 mark each).

Section A: Multiple Choice Questions ($8 \times 1 = 8$ Marks)

1. Two parallelograms are on the same base and between the same parallels. The ratio of their areas is:
2. A median of a triangle divides it into two triangles of:
3. If a triangle and a parallelogram are on the same base and between the same parallels, then the ratio of the area of the triangle to the area of the parallelogram is:
4. In a parallelogram $ABCD$, P is any point on CD. If $area(ABCD) = 48\ cm^2$, then $area(\triangle APB)$ is:
5. The area of a rhombus whose diagonals are 12 cm and 16 cm is:
6. If the base of a triangle is doubled and the corresponding altitude is halved, its area will:
7. Parallelogram $ABCD$ and rectangle $ABEF$ are on the same base AB and have equal areas. The perimeter of the parallelogram is:
8. In $\triangle ABC$, E is the mid-point of median AD. Then $area(\triangle BED)$ is equal to:

Section B: Very Short Answer Questions ($4 \times 2 = 8$ Marks)

1. Show that a diagonal of a parallelogram divides it into two triangles of equal area.
2. In the following figure, $PQRS$ is a parallelogram and X is any point on RS. Prove that $area(\triangle PXQ) = area(\triangle PSX) + area(\triangle QRX)$.



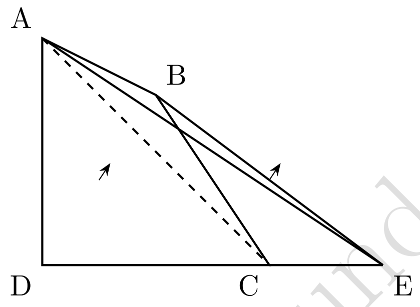
3. If E, F, G, H are the mid-points of the sides of a parallelogram $ABCD$ respectively, show that $area(EFGH) = \frac{1}{2}area(ABCD)$.

4. $\triangle ABC$ and $\triangle ABD$ are on the same base AB. If line segment CD is bisected by AB at O, show that $area(\triangle ABC) = area(\triangle ABD)$.

Section C: Short Answer Questions (3 × 3 = 9 Marks)

1. Prove that triangles on the same base and between the same parallels are equal in area.

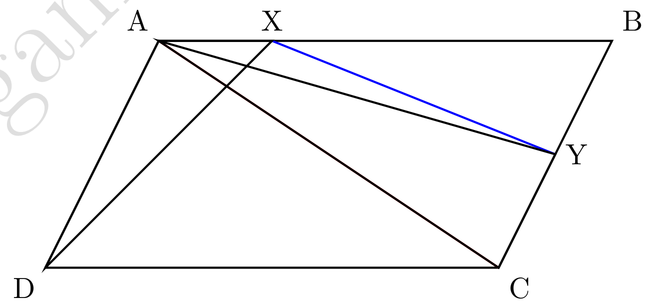
2. In the figure, $ABCD$ is a quadrilateral and $BE \parallel AC$ meets DC produced at E. Show that $area(ABCD) = area(\triangle ADE)$.



3. P and Q are any two points lying on the sides DC and AD respectively of a parallelogram $ABCD$. Show that $area(\triangle APB) = area(\triangle BQC)$.

Section D: Long Answer Questions (2 × 5 = 10 Marks)

1. $ABCD$ is a trapezium with $AB \parallel DC$. A line parallel to AC intersects AB at X and BC at Y. Prove that $area(\triangle ADX) = area(\triangle ACY)$.



2. D, E and F are respectively the mid-points of the sides BC, CA and AB of a $\triangle ABC$. Show that:

   (a) $BDEF$ is a parallelogram.

   (b) $area(DEF) = \frac{1}{4}area(ABC)$.

   (c) $area(BDEF) = \frac{1}{2}area(ABC)$.

Section E: Case Study Question (5 Marks)

A farmer, Budhia, had a plot of land in the shape of a quadrilateral $ABCD$. He decided to donate a portion of his land to the local Gram Panchayat for a Health Centre, but he wanted a condition to be met: the donated portion must be a triangular area ABC such that his remaining land remains a triangle ADE. The village Patwari explained that this could be achieved by drawing a line through vertex B parallel to the diagonal AC, meeting the extension of side DC at point E. By joining AE, the land is restructured without changing the total area of the farmer's possession. This geometric principle relies on the property of triangles sharing the same base and lying between the same parallel lines. The villagers were amazed to see how geometry solved a practical land distribution problem fairly.

1. Which geometric figure is used as the base for the triangles to show equal area?
2. If $area(\triangle BAC) = 500\ m^2$, then $area(\triangle EAC)$ is:
3. The line BE is drawn parallel to which diagonal of the quadrilateral?
4. Which theorem justifies that $area(ABCD) = area(\triangle ADE)$?
5. If the altitude between the parallels increases, what happens to the ratio of the areas?

***** End of Question Paper *****