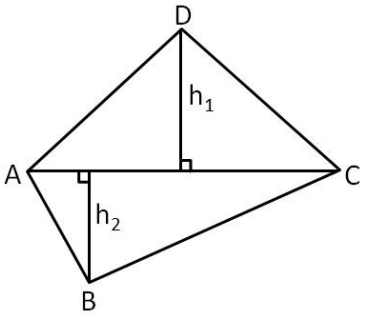
Area of General Quadrilateral

Understanding of Area of a General Quadrilateral



- A quadrilateral is a four-sided figure with four vertices and four sides.
- A general quadrilateral does not have any special property like parallel sides or equal sides.
- To find the area, we usually divide the quadrilateral into two triangles by drawing a diagonal.
- Find the area of both triangles separately and add them.

Important Points

- Divide the quadrilateral into two triangles by drawing one diagonal.
- **Find the area of each triangle using the formula:** Area of triangle = $\frac{1}{2}$ × base × height
- Add the areas of the two triangles to get the total area.
- Measurements must be in the same unit.
- Always mention the unit of area in square units like cm², m² etc.

Examples with Solutions

Example: Simple Quadrilateral

➢ **A quadrilateral is divided into two triangles with areas 30 cm² and 20 cm². Find the total area.**

Solution: Total Area = 30 + 20 = 50 cm²

Example: Using Base and Height

➢ **In a quadrilateral ABCD, a diagonal AC divides it into two triangles. Area of triangle ABC with base 8 cm and height 5 cm, Area of triangle ADC with base 10 cm and height 6 cm. Find the area of the quadrilateral.**

Solution: Area of triangle ABC = $\frac{1}{2}$ × 8 × 5 = 20 cm²

Area of triangle ADC = $\frac{1}{2}$ × 10 × 6 = 30 cm²

Total Area = 20 + 30 = 50 cm²

Example: Quadrilateral with Diagonal Given

- **In quadrilateral PQRS, diagonal PR divides it into two triangles. Area of triangle PQR = $\frac{1}{2} \times 12 \times 7$ and area of triangle PRS = $\frac{1}{2} \times 9 \times 8$. Find total area.**

Solution: Area of triangle PQR = $\frac{1}{2} \times 12 \times 7 = 42$ cm²

Area of triangle PRS = $\frac{1}{2} \times 9 \times 8 = 36$ cm²

Total Area = 42 + 36 = 78 cm²

Example: Area when Diagonal is Perpendicular

- **In quadrilateral EFGH, the diagonal EG is perpendicular to sides EF and EH. If EF = 6 cm, EH = 8 cm, and EG = 5 cm, find the total area.**

Solution: Divide into two right-angled triangles.

Area of triangle EFG = $\frac{1}{2} \times 6 \times 5 = 15$ cm²

Area of triangle EHG = $\frac{1}{2} \times 8 \times 5 = 20$ cm²

Total Area = 15 + 20 = 35 cm²

Example: Quadrilateral with Equal Triangles

- **A quadrilateral is divided into two triangles of equal area. Each triangle has area 24 m². Find the area of the quadrilateral.**

Solution: Total Area = 24 + 24 = 48 m²

Summary Points

- Divide the quadrilateral into two triangles
- Use Area of triangle = $\frac{1}{2} \times$ base × height
- Add the areas of both triangles
- Always use same units for all measurements
- Final area is always in square units like cm² or m²