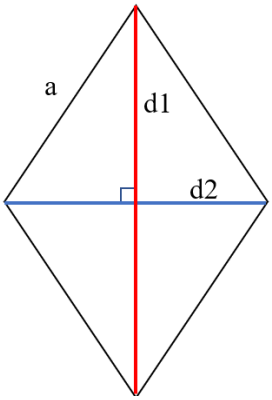
Area of Special Quadrilateral-Rhombus

Understanding of Area of Special Quadrilateral - Rhombus



- A rhombus is a special type of quadrilateral where all four sides are equal in length.
- The diagonals of a rhombus bisect each other at right angles (90 degrees).
- The diagonals are not equal but they divide the rhombus into four right-angled triangles.
- The area of a rhombus can be found using the lengths of its diagonals.

Important Points

- Formula for Area of Rhombus = $\frac{1}{2}$ × (product of diagonals) = $\frac{1}{2} \times d_1 \times d_2$
- d_1 and d_2 are the lengths of the diagonals.
- Diagonals meet at 90°.
- If diagonals are not given, other methods like using base and height can also be used: **Area = base × height**.
- Always express the final area in square units like cm² or m².

Examples with Solutions

Example: Using Diagonals

➢ **Find the area of a rhombus whose diagonals are 10 cm and 8 cm.**

Solution: Area = $\frac{1}{2} \times 10 \times 8$

= $\frac{1}{2} \times 80 = 40$ cm²

Example: Using Base and Height

➢ **Find the area of a rhombus with side 6 cm and height 5 cm.**

Solution: Area = base × height = 6 × 5 = 30 cm²

Example: Area When Only One Diagonal and Side Given

- **A rhombus has one diagonal 12 cm long and each side 10 cm. Find the other diagonal and area.**

Solution: Use Pythagoras Theorem

Half diagonal = $\sqrt{(side^2 - (half\ of\ given\ diagonal)^2}$

Half of given diagonal = 6 cm

Half of unknown diagonal = $\sqrt{10^2 - 6^2} = \sqrt{100 - 36} = \sqrt{64}$ = 8 cm

Full diagonal = 8 × 2 = 16 cm

Area = $\frac{1}{2}$ × 12 × 16 = 96 cm²

Example: Area with Equal Diagonals

- **Find the area of a rhombus if both diagonals are equal and measure 6 cm.**

Solution: Area = $\frac{1}{2}$ × 6 × 6 = 18 cm²

Example: Area Using Diagonals with Fractions

- **Find the area of a rhombus with diagonals $\frac{7}{2}$ m and $\frac{5}{2}$ m.**

Solution: Area = $\frac{1}{2} \times \left(\frac{7}{2}\right) \times \left(\frac{5}{2}\right)$

= $\frac{1}{2} \times \frac{35}{4} = \frac{35}{8}$ = 4.375 m²

Summary Points

- Area of a rhombus = $\frac{1}{2}$ × product of diagonals.
- Diagonals meet at right angles.
- If base and height are given, use Area = base × height.
- Always use the same unit for all measurements.
- Area is always expressed in square units.