Activity 5

Area of a rhombus

Objective

To show that the area of a rhombus is half the product of its diagonals using paper cutting and pasting.

Pre-requisite knowledge

- 1. Properties of a rectangle and a rhombus.
- 2. Formula for area of a triangle and a rectangle.
- 3. Concept of congruency.

Material Required

Colored papers, sketch pens, geometry box, a pair of scissors, fevicol and eraser.

Procedure

- 1. Draw a rectangle ABCD with length d₂ and breadth d₁ units on a coloured paper.
- 2. Mark points E, F, G and H as mid points of the sides AD, DC, CB and BA respectively of sides of the rectangle ABCD drawn in step 1. [Fig 5 (a)]
- 3. Join HF and EG. Mark their intersection as point O. Fold the rectangle ABCD along EG and HF dividing the rectangle ABCD into four congruent rectangles, namely OEAH, OEDF, OFCG and OGBH.
- 4. Divide each of the four rectangles into two congruent triangles by drawing their respective diagonals. [Fig 5 (a)]

Observations

- 1. As the smaller rectangles are congruent, their diagonals EH, HG, GF, FE are equal. Thus EHGF is a rhombus.
- 2. In the rectangle AHOE, triangles AHE and EHO are congruent and hence equal in area.
- 3. Thus area of the right triangle EOH is half the area of the rectangle AEOH and similarly, the area of right triangles HOG, GOF, FOE are half the area of the rectangles HBGO, OGCF and FOED respectively.
- 4. Thus the area of rhombus = $\frac{1}{2}$ × area of rectangle
 - $= \frac{1}{2} \times d_1 \times d_2$
 - = $\frac{1}{2}$ × product of diagonals

Learning Outcomes

- 1. This activity shows construction of the rhombus by paper folding.
- 2. Students understand geometrically, that the area of rhombus is half the product of its diagonals.

Remark

This activity may be extended to the case of a Kite and the same formula may be verified.

