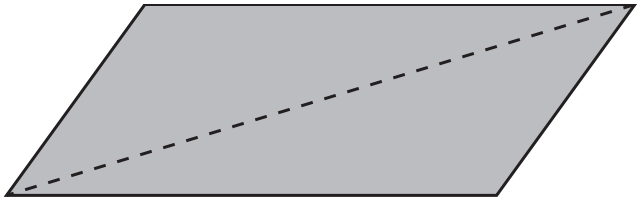
Activity 16&17



Properties of parallelogram

Objective
To explore similarities and differences in the properties with respect to diagonals of the following quadrilaterals – a parallelogram, a square, a rectangle and a rhombus.

Pre-requisite knowledge
1. Construction of the diagram of parallelogram, rhombus, square and rectangle.
2. Knowledge of properties of sides and angles of the above mentioned figures.

Material Required
Chart papers, pencil, compass, scale and a pair of scissors.

Property 1: A diagonal of a parallelogram divides it into two congruent triangles.

Procedure
1. Make a parallelogram on a chart paper and cut it.
2. Draw diagonal of the parallelogram [Fig 16&17(a)].
3. Cut along the diagonal and obtain two triangles.
4. Superimpose one triangle onto the other [Fig 16&17(b)].

Observation
Two triangles are congruent to each other.

Learning Outcome
Students would be able to infer that diagonal always divides the parallelogram into two triangles of equal areas.

Remark
Repeat the same activity with the other diagonal of the parallelogram.

Property 2 : Diagonals of a parallelogram bisect each other.

Procedure
1. Draw the parallelogram and its both diagonals.
2. Cut the four triangles formed. Name them 1, 2, 3 and 4 [Fig 16%17(c)].
3. Observe that triangle 2 is congruent to triangle 4 and triangle 1 is congruent to triangle 3 by superimposing them on each other.

Observations
1. Base of triangle 2 = Base of triangle 4
2. Base of triangle 1 = Base of triangle 3
3. Thus the diagonals bisect each other.

Learning Outcome

Students can also infer that vertically opposite angles are equal.

Remark

1. Teacher can ask the students to check the congruency of the triangle 1 and triangle 4. Why these triangles are not congruent?
2. Teacher can ask the students to repeat the same activities with rhombus, square and rectangle to find the properties of diagonals.
3. The students can explore when diagonals bisect each other at right angles and other properties (using elementary methods of paper folding described in activity 1A).
4. Students should summarize the results in the following format.

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Sr. No.	Properties	Parallelogram	Square	Rectangle	Rhombus
1	Diagonals bisect each other	yes	yes	yes	yes
2	Diagonals are perpendicular to each other				
3	Diagonals have equal length				
4	Diagonal divides the given quadrilateral into two congruent triangles				

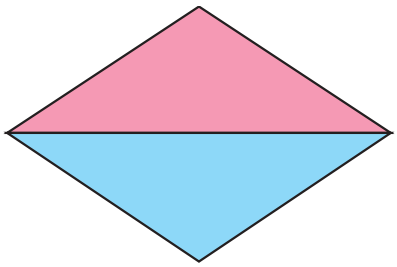

Fig 16 & 17 (a)

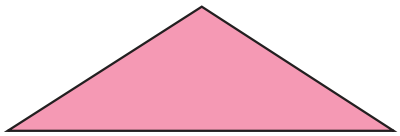

Fig 16 & 17 (b)

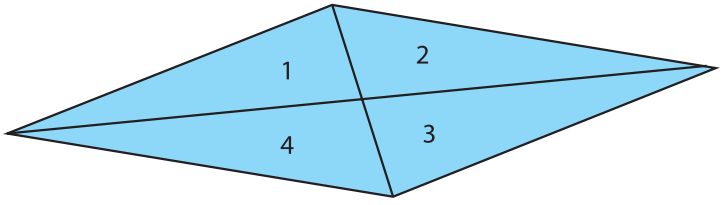

Fig 16 & 17 (c)