Activity 1A

Basic paper folding activity

Objectives

To carry out the following paper folding activities:
Finding -

1. the mid point of a line segment,
2. the perpendicular bisector of a line segment,
3. the bisector of an angle,
4. the perpendicular to a line from a point given outside it,
5. the perpendicular to a line at a point given on the line,
6. the median of a triangle.

Pre-requisite knowledge

Meaning of the basic geometrical terms such as perpendicular bisector, angle bisector and median.

Materials required

Rectangular sheets of coloured paper, a pair of scissors.

Procedure

1. Make a line segment on the paper, by folding the paper in any way. Call it AB. Fold the line segment AB in such a way that A falls on B, halving the length of AB. Mark the point of intersection of line segment AB and the crease formed by folding the paper. This gives the mid-point E of segment AB. [Fig 1A (a)]
2. Fold AB in such a way that A falls on B, thereby creating a crease EF. This crease is the perpendicular bisector of AB. [Fig 1A (b)]
3. Cut a triangle from a coloured paper and name it PQR. Fold along the vertex P of the triangle in such a way that the sides PQ and PR coincide with each other. The crease PF formed is the angle bisector of the angle P. [Fig 1A (c)]
4. Draw a line segment AB and take a point P outside it. Move B along BA till the fold passes through P and crease it along that line. The crease formed is the perpendicular to AB from point P. [Fig 1A (d)]
5. Draw a line AB and take a point C on it. Move B along the line BA till the fold passes through C and crease it at along that line. The crease so formed is the perpendicular to AB at the point C on it. [Fig 1A (e)]
6. Cut out a triangle ABC. Find the mid-points of the sides by the method given in step 1. Join A, B, C to the respective mid-points of opposite sides, BC, CA and AB by paper folding. The creases formed are the medians of the triangle. [Fig 1A (f)]

Observations

In some cases the students may like to verify the results obtained in this activity by actual measurement.

Learning Outcomes

Students are exposed to the basic features of paper folding. They will appreciate that several geometrical constructions can be carried out very simply by paper folding.

Remark

The teacher should ensure that students get enough practice in this activity, since this is basic for many of the subsequent laboratory activities given in the booklet.

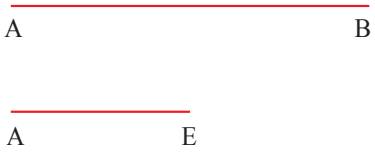


Fig 1A (a)

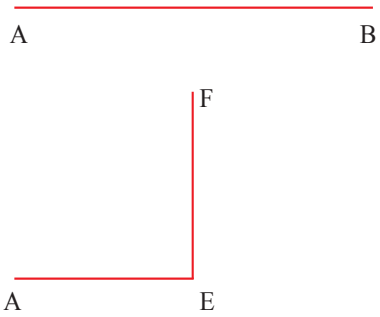


Fig 1A (b)

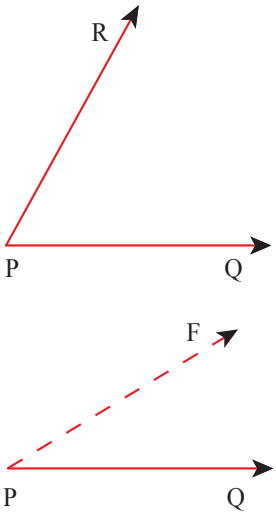


Fig 1A (c)

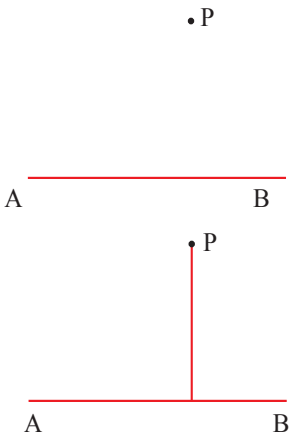


Fig 1A (d)

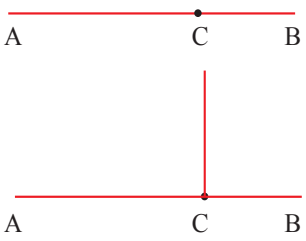


Fig 1A (e)

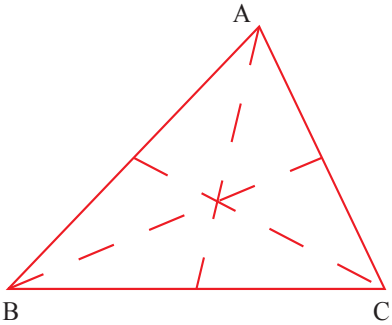
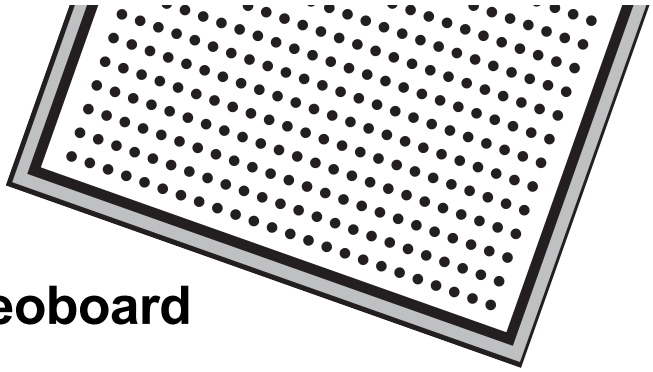


Fig 1A (f)



Activity 1B

Basic activities using Geoboard

Objectives

To carry out the following activities using a geoboard:

1. Find the area of any triangle.
2. Find the area of any polygon by completing the rectangles.
3. Obtain a square on a given line segment.
4. Given an area, obtain different polygons of the same area.

Pre-requisite knowledge

Basic understanding about names and properties of the shapes.

Materials required

Square wooden board of 10" × 10", nails with small heads, hammer, rubber bands, marking pen.

Procedure

Making Geoboard

Take a wooden square base. Mark an array of 10 × 10 dots on this wooden base. Fix nails on these equidistant dots.

Activities on Geoboard

1. Practice making various geometric figures using rubber bands on the geoboard.
2. Find area of regular quadrilaterals by counting number of unit squares in it.
3. Find the area of triangles by completing triangles into rectangles and halving them. Verify the result using formula for area of triangles.
4. Make any irregular polygon, complete the rectangles at the non-horizontal/ vertical sides of the polygon, and find the area of various polygons. [Fig 1B (a)]
5. Given any line segment on the geoboard, ask students to form a square, with this line segment as the base.
6. If the area of any polygon is given, find the different possibilities of shapes with same area. In Fig 1B b) the area of all the shapes is same and is 12 sq.units.

Observations

1. Students observe that the area of any shape is equal to the number of unit squares in the space occupied by that shape.
2. Students find it interesting to find the area of any irregular polygon by the method of completing rectangles.

Learning outcomes

1. Students learn the concept of area as number of unit squares in the space occupied by the shape.

2. They learn the relation between area and the formula for the area of any shape.
3. The activities like constructing a square on a given line and making various polygons of a given area, enable students to think logically. It also helps them to develop spatial understanding about the objects.

Remark

Many theorems can be verified on the geoboard, for e.g. the area of any triangle on the same base and between the same parallel lines is half that of the parallelogram.

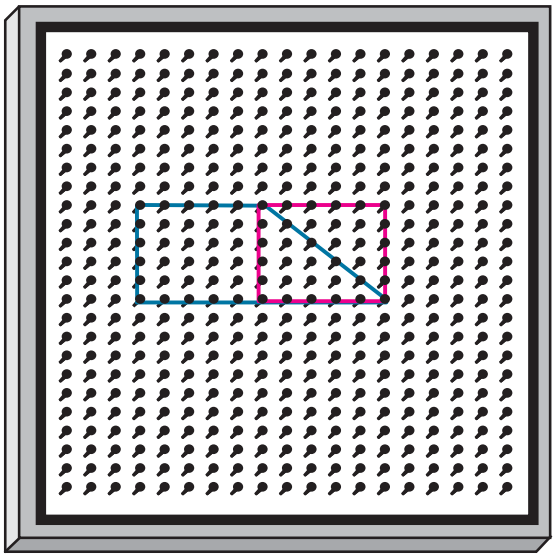


Fig 1B (a)

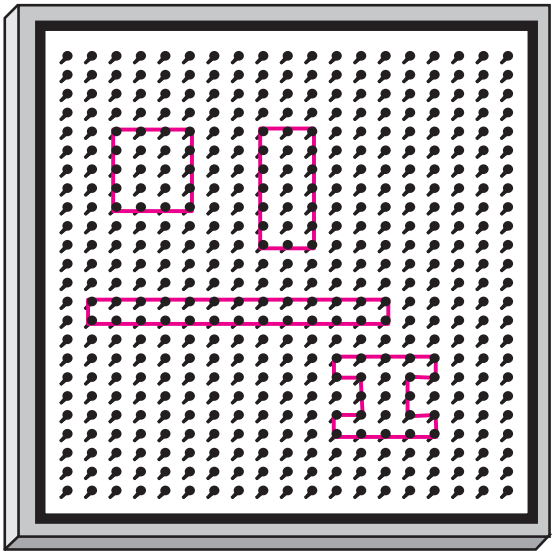


Fig 1B (b)