

ACTIVITY

17



Title

Line of Symmetry.



Objective

To understand the concept of symmetry and find lines of symmetry by paper folding.



Prerequisite knowledge

1. Concept of regular polygons.
2. Concept of lines of symmetry *i.e.*, a figure has line symmetry if it can be divided by a line into two parts, each of which is the mirror image of the other and if this figure is folded about this line, the two halves of the figure coincide precisely.



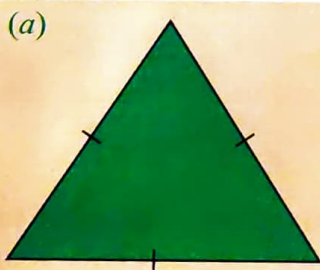
Materials required

A drawing sheet, a tracing paper, a pair of scissors, glue stick, sketch pens and a geometry box.

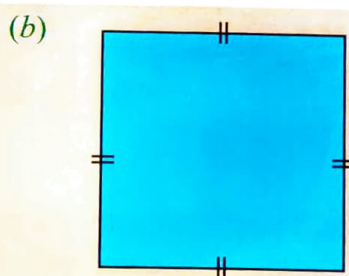


Procedure

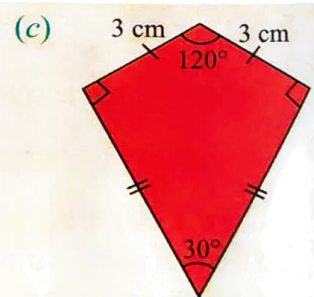
1. Draw the following figures on the drawing sheet :



An equilateral triangle



A square



A kite

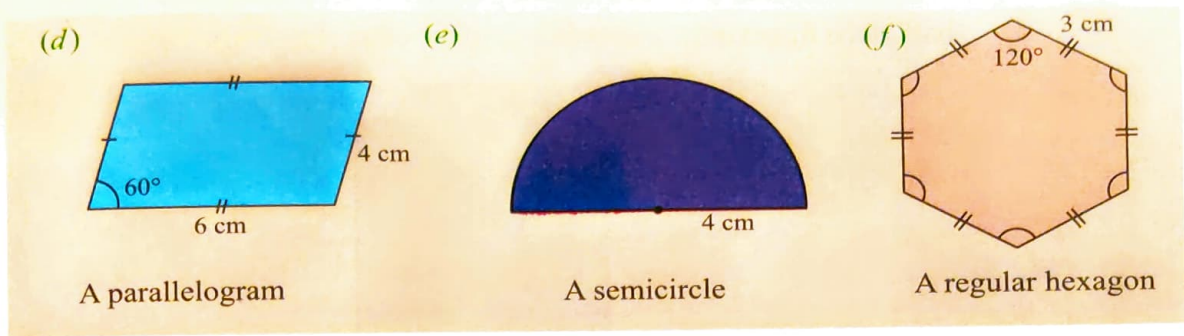


Fig. (i)

2. Redraw all these figures on a tracing paper one by one from the drawing sheet. (You can directly trace it from this laboratory manual itself using a sketch pen.)
3. Next cut all these figures from the tracing paper.
4. In each of these cases identify the lines of symmetry by folding the paper in such a way that the left and the right halves match precisely. Unfold the paper and draw these lines of symmetry by dotted lines.

Let us apply step 4 to the [Fig. (i)] (a) to (f) given above.

- (a) In equilateral triangle ABC, fold the triangle such that vertex B coincides with vertex C, unfold the triangle and draw a dotted line ① along the crease. Similarly, obtain two more dotted lines, ② and ③ when C coincides with A, and A coincides with B respectively [Fig. (ii)].

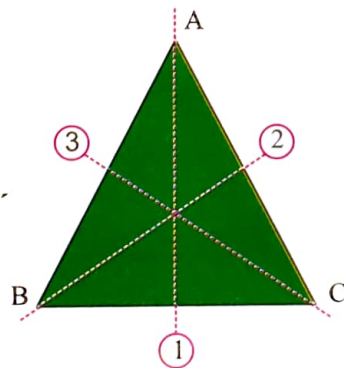


Fig. (ii)

We see that when the triangle is folded along any of these lines the two parts completely overlap each other. Hence an equilateral triangle has three lines of symmetry.

Similarly, try to fold the other figures in such a way that the figure is divided into identical, but reversed halves. **Verify** that the figure shown above have the following lines of symmetry.

- (b) A square has four lines of symmetry. If a mirror is placed on each of these lines of symmetry one half of the figure is the mirror image of the other [Fig. (iii)].

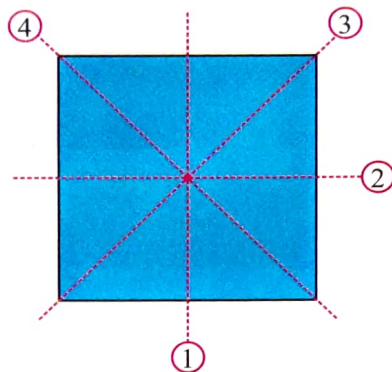


Fig. (iii)

- (c) A kite has only one line of symmetry [Fig. (iv)].

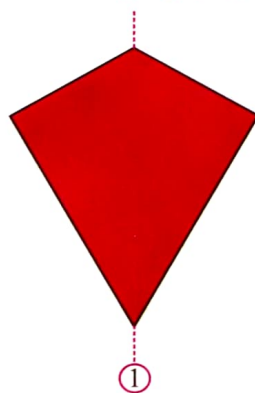


Fig. (iv)

- (d) For a parallelogram there is no line of symmetry [Fig. (v)].



Fig. (v)

- (e) A semicircle has only one line of symmetry [Fig. (vi)].

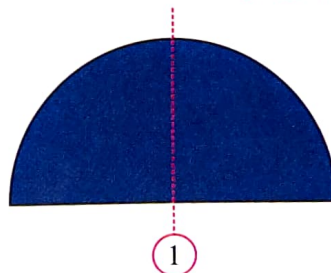


Fig. (vi)

(f) For a regular hexagon there are six lines of symmetry [Fig. (vii)].

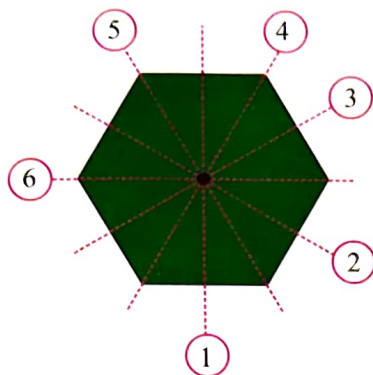


Fig. (vii)

Observation

The number of lines of symmetry varies in different figures. The concept of line symmetry is closely related to mirror reflection. A shape has a line of symmetry when one half of it is the mirror image of the other half.

Result

A regular polygon has all its sides equal and each of its angle measures is same. So a regular polygon always has lines of symmetry. The number of lines of symmetry of a regular polygon is equal to the number of its sides.

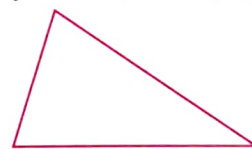
Learning outcome

Learners will be able to understand the concept of lines of symmetry by paper folding.

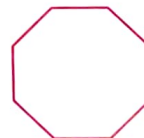
Activity time

1. Identify the lines of symmetry, if any in each of the following figures by tracing and paper folding.

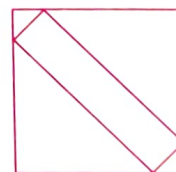
(a) A scalene triangle.



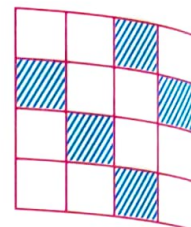
(b) A regular octagon.



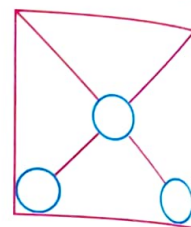
(c) A rectangle inside a square.



(d) A square sub-divided into smaller squares. Some of which are shaded.



(e) A square with punched holes.



Remarks / Notes

1. Line symmetry and mirror reflection are related and linked to each other, but care is needed to note the left-right changes in the orientation.
2. Line symmetry is found in abundance everywhere around us collect samples of symmetrical figures found in nature, in your house, school, etc., and prepare an album.