Chapter 11

Symmetry

11.1 Carefully look at the pictures below.

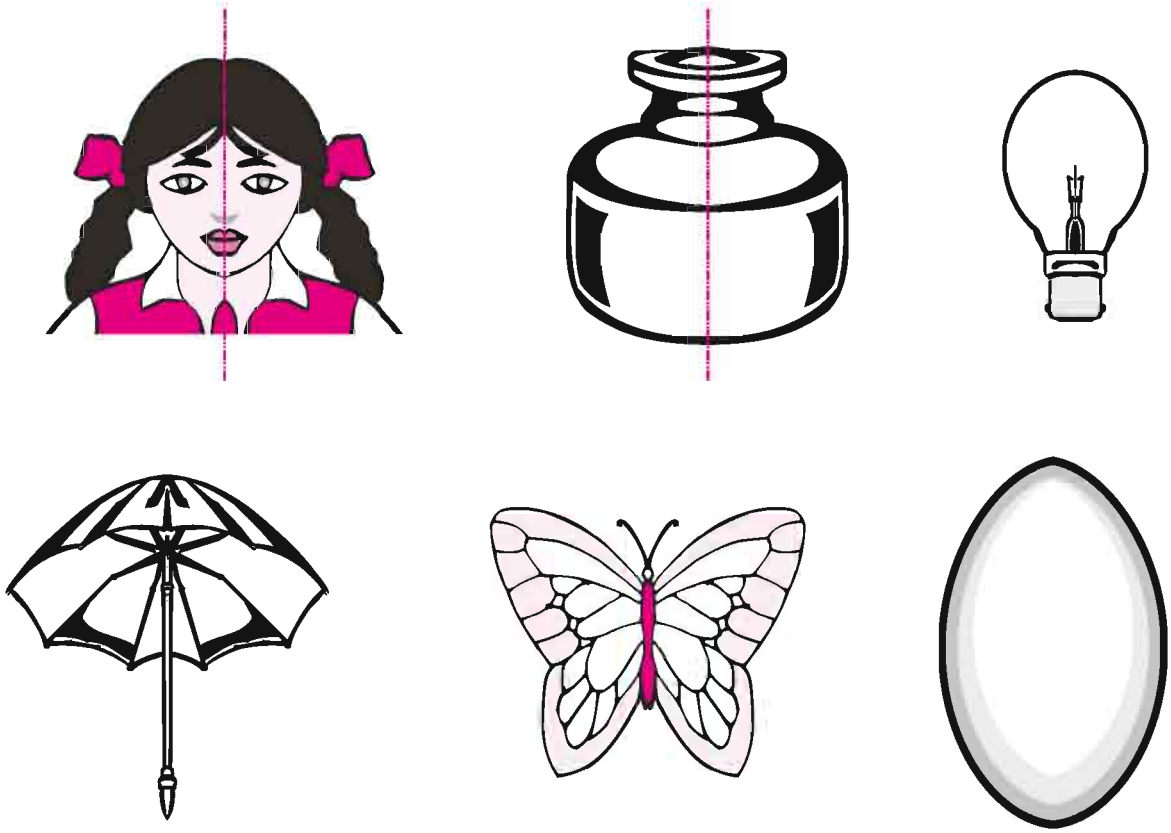


Fig. 11.1

Discuss with your friends and answer the following questions.

(i) Two pictures are divided with dashed lines. The dashed line divides the picture in how many parts?

(ii) Are these parts identical?

(iii) Can we draw more lines like the one already drawn?

(iv) Can we draw such line in all the pictures above? Do try and see.

You will find that the dashed line divides the picture in two equal halves. Imagine that you folded the picture along the dashed line such that the left and right halves match exactly. Or, if you placed a mirror along the dashed line, you would see the other half of the figure reflected in the mirror. Such lines are called the line or axis of symmetry and such figures are called symmetrical figures.

Do and Learn.

A dashed line is drawn in each of the following figures. Can you tell whether the line is a line of symmetry or not?

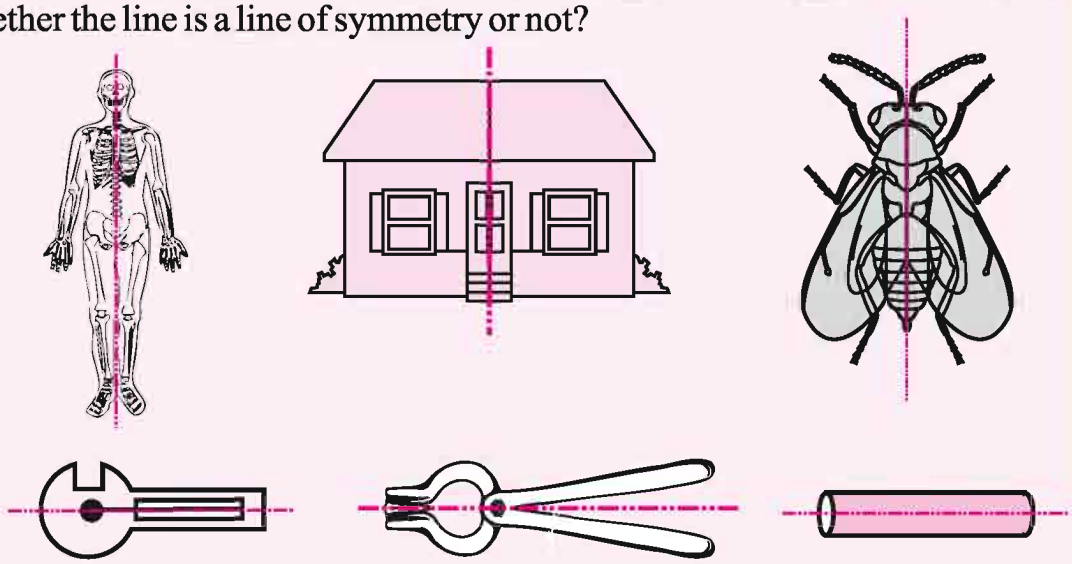


Fig. 11.2

A line of symmetry divides the figure in two equal halves which match exactly. It can be horizontal, vertical or inclined. When you fold the figure along the dotted line, one half of the figure would fit exactly over the other half. This line can be real or virtual. Generally, symmetrical figures look beautiful than asymmetrical figures.

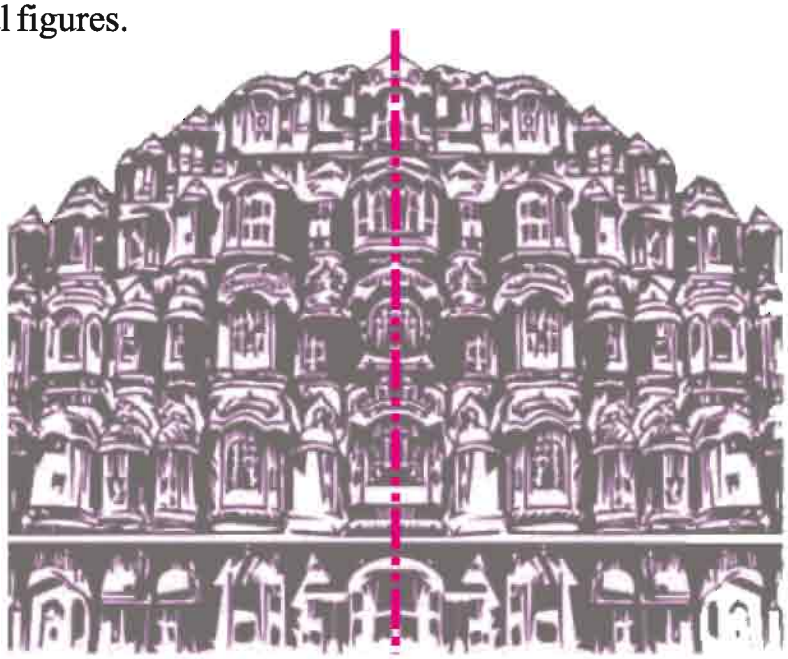


Fig. 11.3

The symmetrical construction is one of the reasons which adds beauty to the world famous Hawa Mahal of Jaipur.

Do and Learn

Two lines of symmetry made in the figures below.

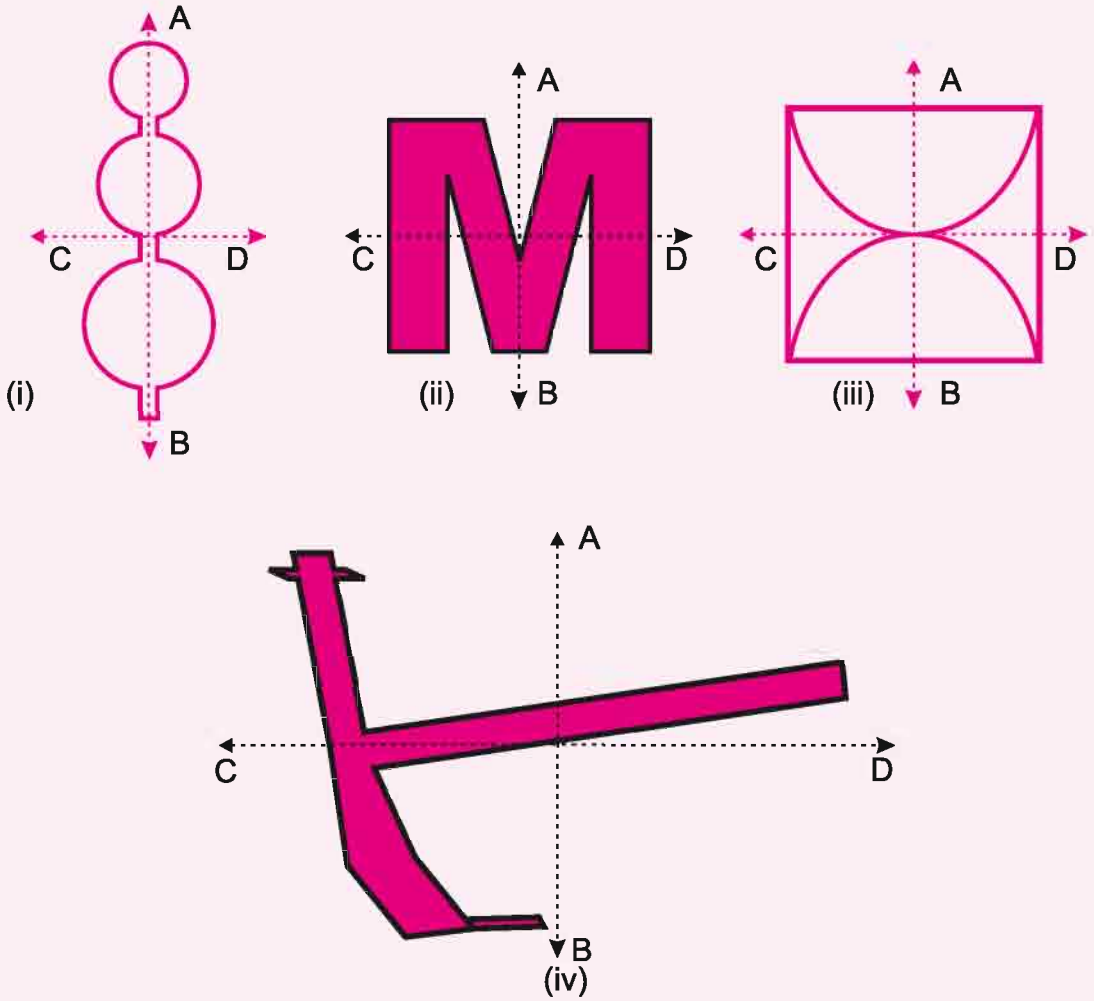


Fig. 11.4

(i) Name the lines of symmetry in each figure.

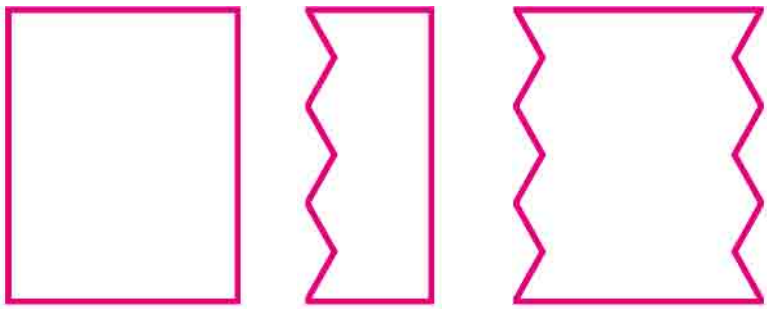
(ii) Is there a figure in which both the lines are lines of symmetry?

(iii) Is AB (the vertical line) the line of symmetry in all the figures?

(iv) Is there any figure in which none of the dashed lines are lines of symmetry?

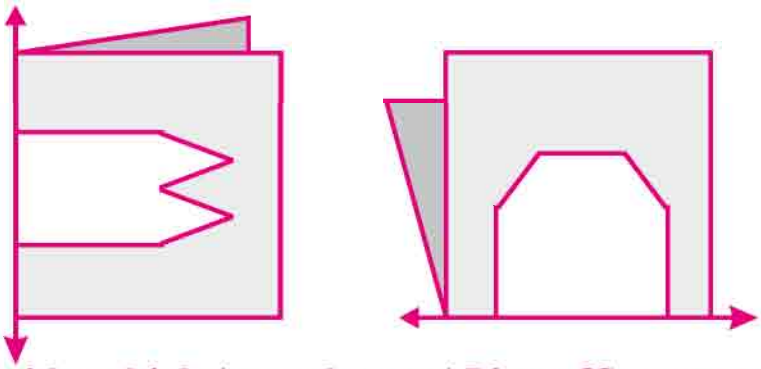
11.2 Explore Symmetry

Take a piece of coloured paper. Fold it in half. Draw the design as shown in the picture below. Cut the shape drawn and unfold the shape.



Repeat the same exercise by folding the paper more than once. You will get interesting figures.

Given here are figures of a few folded sheets and designs drawn about the fold. In each case, draw a rough diagram of the complete figure that would be seen when the design is cut off.



11.3 Figures with multiple (more than one) Lines of Symmetry

From the above examples, we found that lines of symmetry can be horizontal or vertical or diagonal or sidelong. Some shapes have only one line of symmetry; some have two lines of symmetry; and some have three or more.

Find the number of lines of symmetry for each of the following shapes:

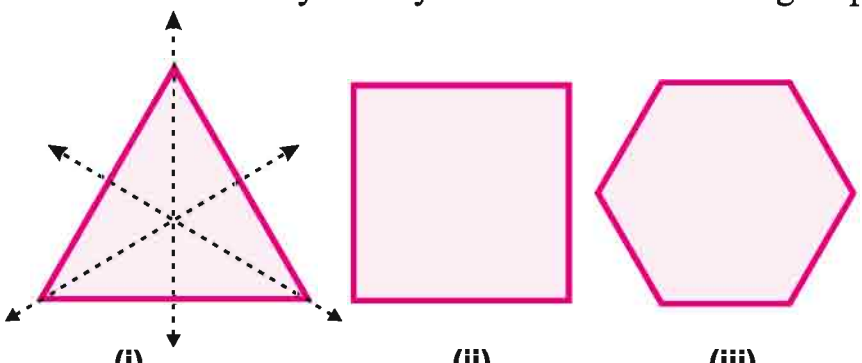


Fig. 11.5

It is now very clear that there can be multiple lines of symmetry in some figures. Number of lines of symmetry in an equilateral triangle, a square and a regular pentagon are three, four and five respectively. Very interesting! Similarly, lines of symmetry keep on increasing as the number of sides keeps on increasing in regular polygons. Now guess the number of lines of symmetry in a regular polygon of 12 sides. Building upon the same logic, we can say that since a circle is a polygon with infinite sides, it has infinite lines of symmetry.

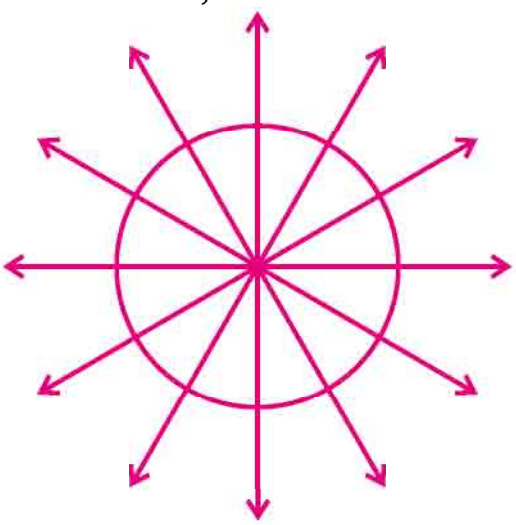


Fig. 11.6

Exercise 11

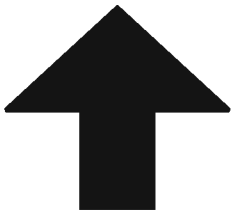
1. (a) Identify the shapes given below. Check whether they are symmetric or not.

(i)

(ii)

(iii)

(iv)



(v)

(vi)

(vii)

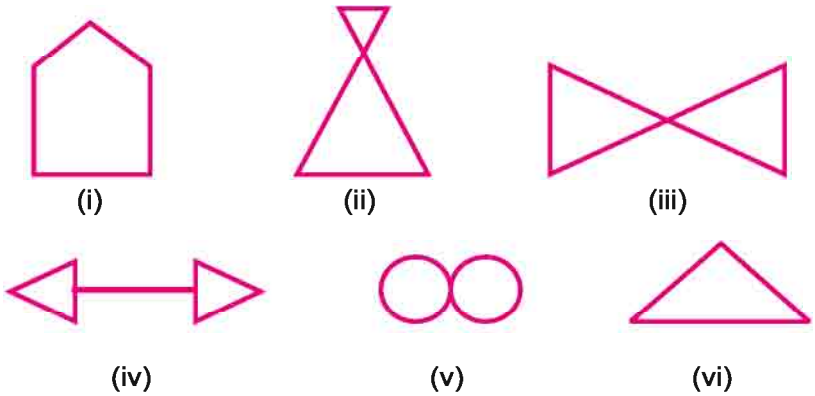
(b) Which of the above shapes have more than one lines of symmetry?

2. Examine the alphabets given below for the existence of symmetry.

A B C E O G H K N W I Z

(i) Which of the above alphabets are not symmetrical?
(ii) Which of the above alphabets are symmetrical?
(iii) Which of the above alphabets have vertical line of symmetry?
(iv) Which of the above alphabets have horizontal line of symmetry?
(v) Which of the above alphabets have vertical as well as horizontal lines of symmetry?
(vi) Which of the above alphabets have more than two line of symmetry?

3. Find the number of lines of symmetry for each of the following shapes:



4.. Make different shapes having two lines of symmetry in each of them.

5. List ten objects you find in your home or school and draw their figures in your notebook. Which of them are symmetric and which are not? Can you identify the lines of symmetry for those objects which are symmetric?

we learnt

1. A figure has line symmetry if a line can be drawn dividing the figure into two identical parts. The line is called a line of symmetry.

2. Number of lines of symmetry in a regular polygon will be equal to the number of sides in that polygon.

Regular Polygon	Number of lines of symmetry
Equilateral Triangle	3
Square	4
Regular Pentagon	5
Regular Hexagon	6