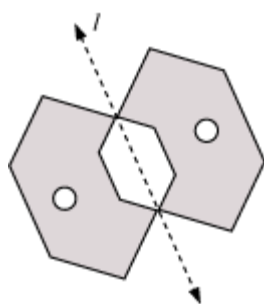


Symmetry

- A figure is said to be symmetrical, if it is in an evenly balanced proportion.
- A figure has line of symmetry, if a line can be drawn dividing the figure into two identical parts in such a way that the two parts are image to each other with respect to the line. The line is called the **line of symmetry**.

Example:

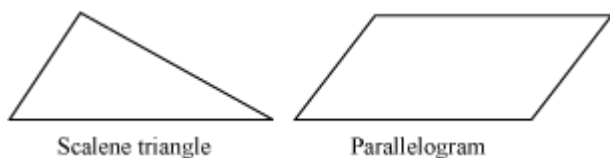


In this figure, the line l divides the above figure into two identical parts such that the two parts are image to each other with respect to the line. This line l is known as the line of symmetry. So, this figure has a line of symmetry.

- A figure may have no line of symmetry, only one line of symmetry, or multiple lines of symmetry.

Example:

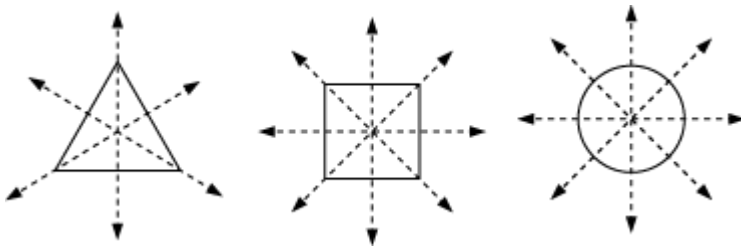
-
- A scalene triangle and a parallelogram has no line of symmetry.



-
- An isosceles triangle, English alphabets A, B etc. shows one line of symmetry.



-
- An equilateral triangle, a square, a circle, etc., show multiple lines of symmetry.



- If a vertical line divides the figure into two identical parts such that the two parts are image to each other with respect to the line, then we say that the figure has a vertical line of symmetry.

Example: In the previous example, the isosceles triangle and the English alphabet A have vertical lines of symmetry.

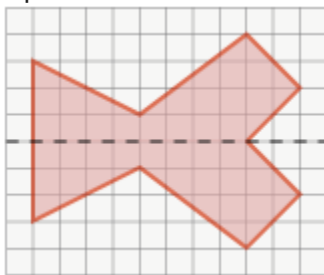
- If a horizontal line divides a figure into two identical parts such that the two parts are image to each other with respect to the line, then we say that the figure has a horizontal line of symmetry.

Example: In the previous example, the English alphabet B has a horizontal line of symmetry.

- The complete figure can be obtained by tracing the given figure below its line of symmetry.

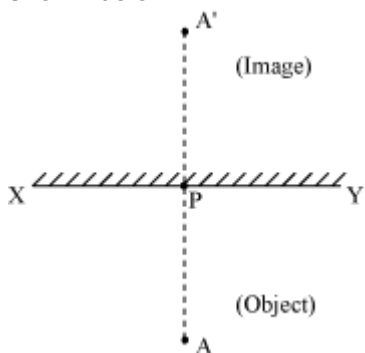


Here, the dotted line is the line of symmetry of the figure. Thus, the complete figure will be represented as:



- Some figures look exactly similar after drawing a dotted line i.e., the left half of the figure is exactly same as the right half of the figure. These figures are known as **symmetrical figures** and the dotted line through which the figure is divided is called **line of symmetry**.
- The line of symmetry is closely related to mirror reflection. When we deal with mirror reflection, we have to take into account that the object and image are symmetrical with reference to the mirror line. There is no change in the length and angle of the object and the corresponding length and angle of the image, with respect to the mirror line; only the left-and-right alignment changes.
- **Axis of reflection or mediator**

Let XY be a mirror. Let A be a point (object) placed in front of it. We obtain its image A' as shown below:



We can notice that:

-
- 1. The distance of the image (A') behind the mirror is same as the distance of the object (A) from it i.e., $PA = PA'$
- 2. The mirror line XY is perpendicular to the line joining the object and the image i.e., $XY \perp AA'$

Here, XY (the mirror line) is called the **axis of reflection** or **mediator**.

If the point A lies on XY, then its image will be this point itself. In such case, A is called an **invariant point** with respect to mirror line XY.