

# Activity 22

## OBJECTIVE

To construct a parabola.

## MATERIAL REQUIRED

Cardboard, white paper, sketch pen, pencil, compass, ruler etc.

## METHOD OF CONSTRUCTION

1. Take a cardboard of a convenient size and paste a white paper on it.
2. Mark a point  $S$  on the white paper on the board (see Fig. 22).
3. Through  $S$  draw a line. Draw another line  $l$  perpendicular to the line through  $S$  at some distance  $k$  units to the left of  $S$ .

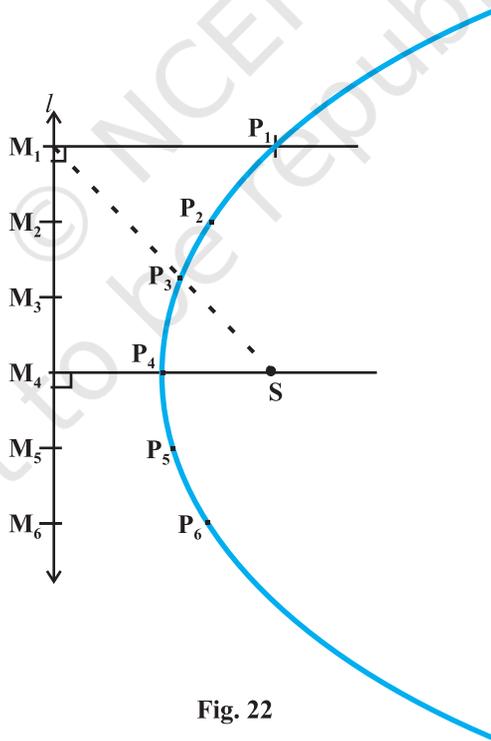


Fig. 22

4. Take any point  $M_1$  on the line  $l$ . Draw the perpendicular to  $l$  at this point.
5. Join  $M_1S$  and draw perpendicular bisector of  $M_1S$  meeting the perpendicular through  $M_1$  at the point  $P_1$ .
6. Take another point  $M_2$  on the line  $l$  and repeat the process as explained in (5) above to obtain the point  $P_2$ .
7. Take some more points  $M_3, M_4, M_5, \dots$  on the line  $l$  and repeat the above process to obtain points  $P_3, P_4, P_5, \dots$ , respectively.
8. Draw a free hand curve through the points  $P_1, P_2, P_3, P_4, \dots$  (see Fig. 22)

### DEMONSTRATION

The points  $P_1, P_2, P_3, \dots$  are such that the distance of each point from the fixed point  $S$  is same as the distance of the point from the line  $l$ . So, the free hand curve drawn through these points is a parabola with focus  $S$  and directrix  $l$ .

### OBSERVATION

1.  $P_1M_1 =$  \_\_\_\_\_       $P_1S =$  \_\_\_\_\_
2.  $P_2M_2 =$  \_\_\_\_\_       $P_2S =$  \_\_\_\_\_
3.  $P_3M_3 =$  \_\_\_\_\_       $P_3S =$  \_\_\_\_\_
4.  $P_4M_4 =$  \_\_\_\_\_       $P_4S =$  \_\_\_\_\_
5.  $P_5M_5 =$  \_\_\_\_\_       $P_5S =$  \_\_\_\_\_
6. The distance of the point  $P_1$  from  $M_1 =$  The distance of  $P_1$  from \_\_\_\_\_.
7. The distance between the points  $P_2$  and  $M_2 =$  The distance of  $P_2$  from \_\_\_\_\_.  
The distance of the point \_\_\_\_\_ from  $M_3 =$  The distance of the point  $P_3$  from \_\_\_\_\_.
8. Distances of the points  $P_1, P_2, P_3, \dots$  from the line  $l$  are \_\_\_\_\_ to the distances of these points from the point  $S$ .
9. Therefore, the free hand curve obtained by joining  $P_1, P_2, P_3, \dots$  is a \_\_\_\_\_ with directrix \_\_\_\_\_ and focus \_\_\_\_\_.

10. Distance of the vertex  $P_4$  and  $S = \underline{\hspace{2cm}}$ .

11. Distance of the vertex of parabola from the directrix =  $\underline{\hspace{2cm}}$ .

### APPLICATION

1. This activity is useful in understanding the terms related to parabola, like directrix, focus, property of the point on the parabola.
2. Parabolas have applications in Science and Engineering.

© NCERT  
not to be republished