

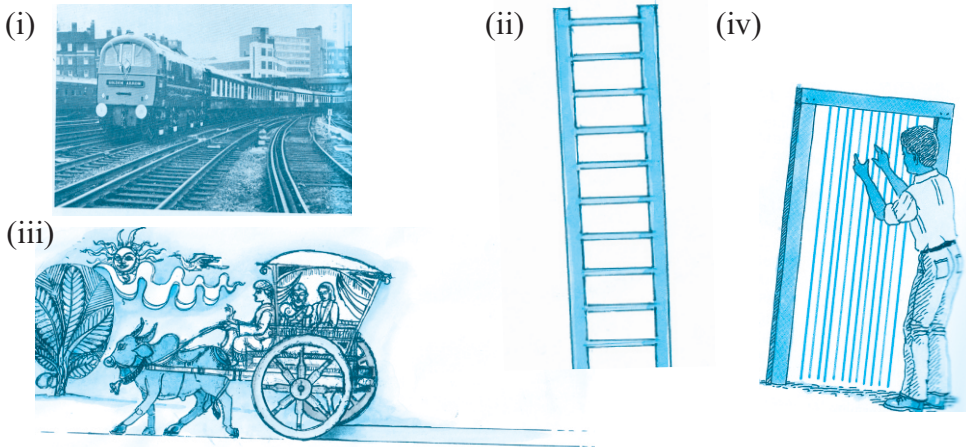
# 12

# Parallel Lines

After studying this chapter you will be able to gain a good understanding of,

- ★ identifying parallel lines.
- ★ drawing parallel lines.
- ★ deciding whether given straight lines are parallel.

## 12.1 Parallel straight line



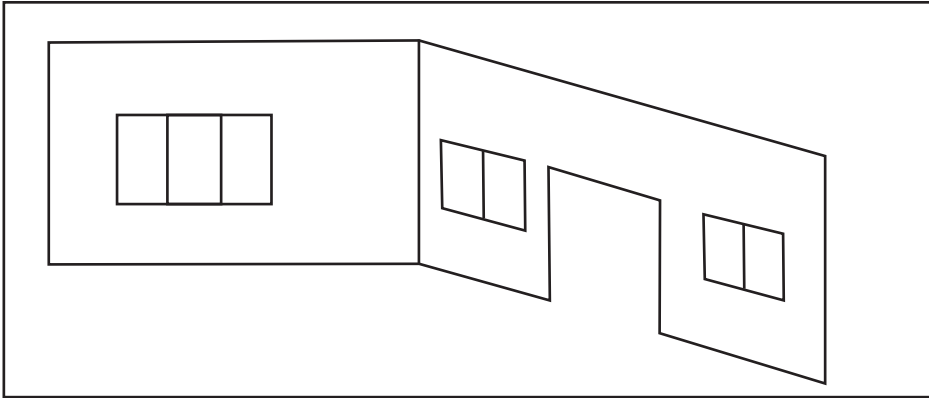
According to the above situations, you will see that the shortest distances,

- ★ (i) between the two railway lines in figure (i),
- ★ (ii) among the rungs of the ladder in figure (ii),
- ★ (iii) between the wheel marks of the cart rim in figure (iii),  
are equal.

If the shortest distance between any two straight lines is always the same, such straight lines are called parallel straight lines. This can also be explained as follows.

The path of a point moving equidistant from a straight line is parallel to the former straight line.

## Activity 12.1



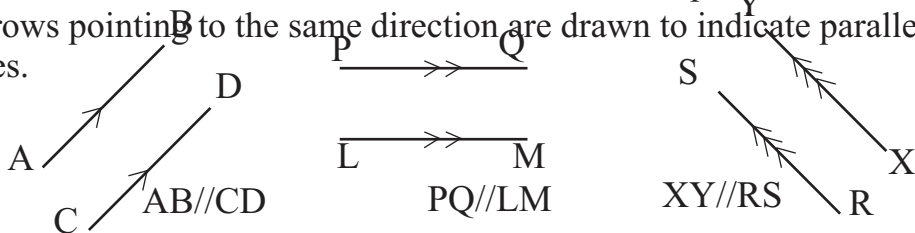
The given figure shows how the doors and the windows are placed in a short and a long wall of a room.

- (1) What is the number of horizontal parallel lines relevant to the short wall of the room?
- (2) What is the number of vertical parallel lines relevant to the short wall of the room?
- (3) What is the number of horizontal parallel lines relevant to the long wall of the room?
- (4) What is the number of vertical parallel lines relevant to the long wall of the room?

Discuss with the teacher the answers you have obtained.

Discuss with the teacher the parallel lines that can be drawn in other directions in addition to horizontal and vertical parallel lines.

Arrows pointing to the same direction are drawn to indicate parallel lines.



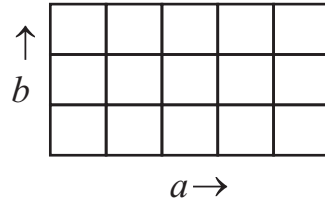
Also parallel lines are written symbolically as  $AB // CD$ ,  $PQ // LM$ ,  $XY // RS$ .

Two parallel lines will never intersect.

### Exercise 12.1

- (1) Select the parallel lines in your class room. Discuss with your teacher and confirm its accuracy.
- (2) A part of a square ruled paper is given in the figure.

Mark the lines parallel to direction "a"  
and the lines parallel to direction "b"

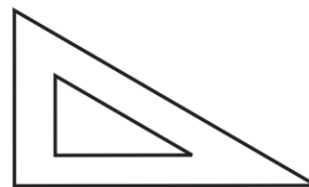


### Activity 12.2

- (i) The instruments used to draw parallel lines are shown below.
  - (a) A 15 cm ruler (straight edge).
  - (b) A set square.



Ruler



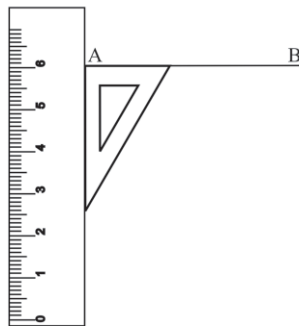
Set square

- (ii) Draw a straight line using the straight edge of the ruler and name it as  $\overline{AB}$ .

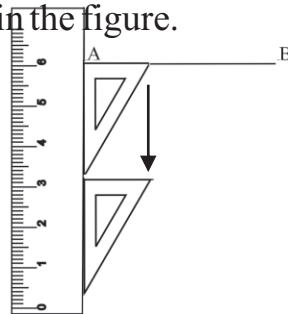
- (iii) Keep the set square on AB in such a way that one side of it which contains the right angle is on AB.



- (iv) Keep the edge of the ruler along the other side of the set square.



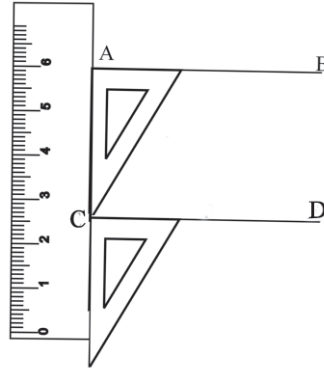
- (v) Without moving the ruler, move the set square along the edge of the ruler as shown in the figure.



- (vi) Stop moving the set square and draw a line along the side which coincides with AB. Name it as CD.



(vii) What can you say about AB and CD?



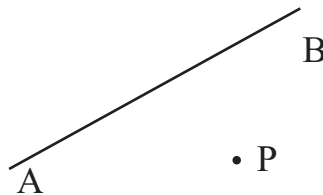
### Exercise 12.2

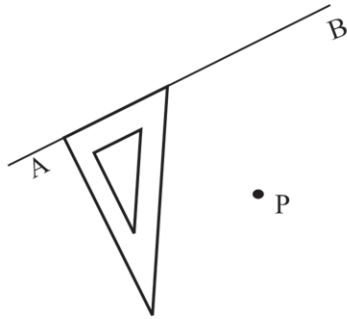
As in the activity 12.1, draw,

- (i) vertical parallel lines.
- (ii) horizontal parallel lines.
- (iii) slanted parallel lines.

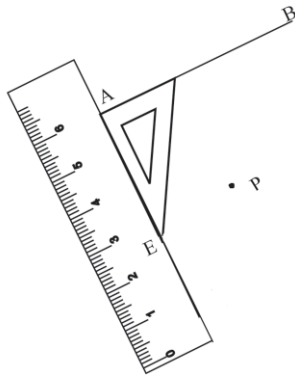
### Activity 12.3

Let us draw a line parallel to AB through a point 'P' outside AB.

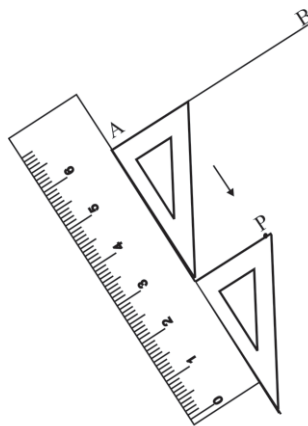




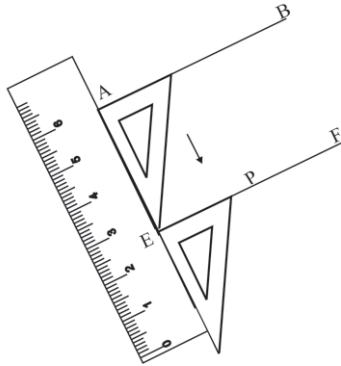
(ii) Keep the edge of the ruler on the other side of the set square.



(iii) Now without moving the ruler, move the set square along the edge of the ruler towards the point 'P'.



(iv) When the edge of the set square which was on AB, comes to 'P'.



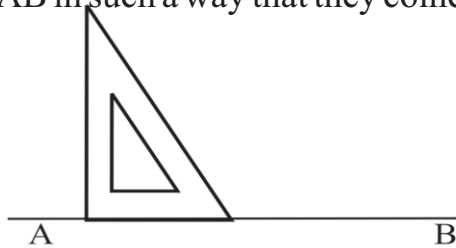
- (v) Name the line drawn through 'P' as EF.
- (vi) What can you say about AB and EF?

**Activity 12.4**

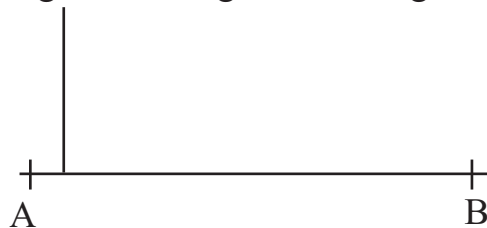
**Drawing a straight line parallel to AB, 5 cm away from it.**

Steps :-

- (I) Keep one of the edges adjoining the right angle of a set square on line AB in such a way that they coincide.



- (ii) Draw a straight line along the other edge.



(iii) Name the point it meets AB as 'Q'.



(iv) Mark a point 'P', 5 cm from AB, on that perpendicular line passing through 'Q'.



(v) Draw a line parallel to AB through 'P' as in **activity 12.3**. Is it perpendicular to AB?

**Exercise 12.3**

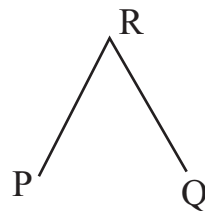
- (1) Draw a straight line and draw a line parallel to it 4 cm away from it. How many such lines can be drawn? Draw them.
- (2) Draw a rectangle ABCD. Draw the diagonal BD and draw a line parallel to it passing through 'A' and another passing through 'C'.
- (3) If the opposite sides of a closed figure with four sides are parallel such a figure is called a parallelogram. Draw a



(4) Draw a figure similar to the given figure.

(i) Draw a line parallel to RQ through 'P' and mark them as parallel with arrows.

(ii) Draw a line parallel to PR through 'Q' and mark them as parallel with arrows.



(iii) Name the point of intersection of the two lines in (i) and (ii) as 'T'.

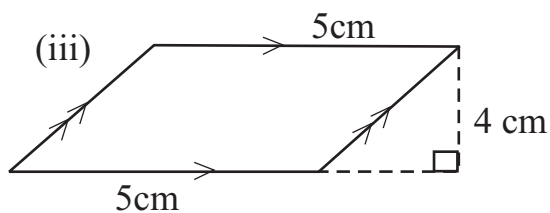
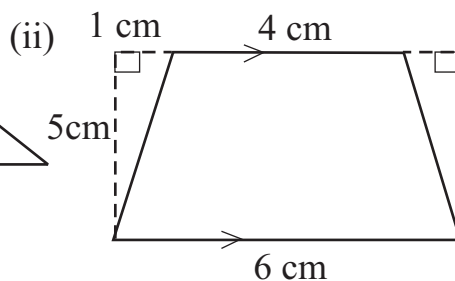
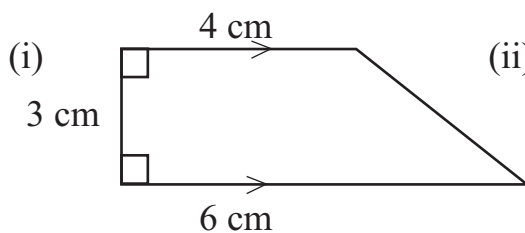
(iv) Propose a suitable name for the quadrilateral PRQT.

(5) (i) Draw a circle and draw an axis of symmetry of it and name it as AB.

(ii) Draw a line parallel to AB and cutting the circle at only one point.

(6) Draw a rectangle of length 6 cm and breadth 4 cm.

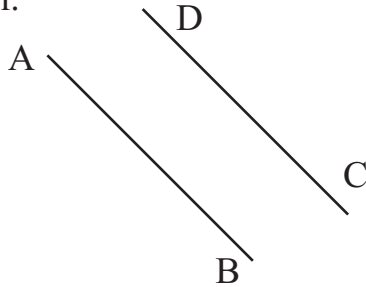
(7) Draw the following figures with the given measurements.



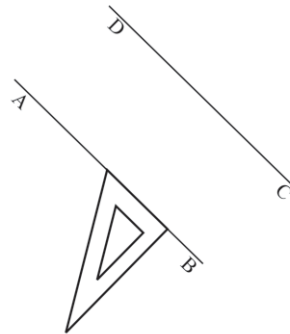
### 12.3 Determining whether given straight lines are parallel.

#### Activity 12.5

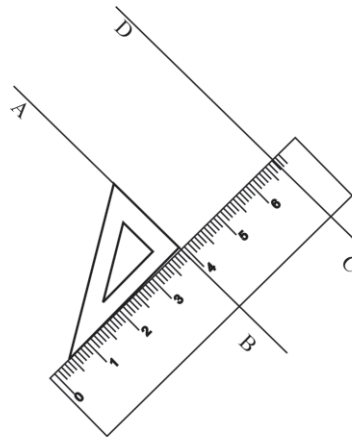
It has to be determined whether the following two straight lines AB and CD are parallel.



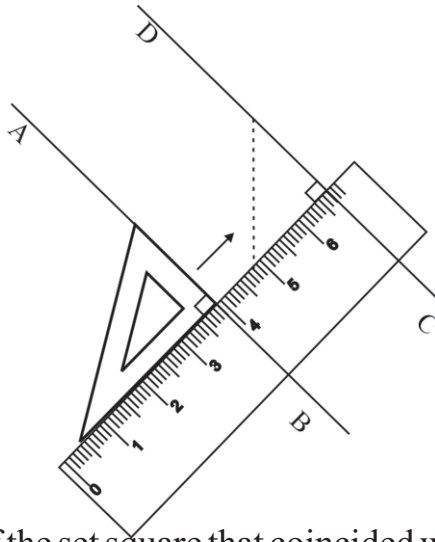
- (i) Keep one edge of the right angle of a set square on the line AB.



- (ii) Keep the ruler along the other edge of the right angle of the set square. \_\_\_\_\_



- (iii) Move the set square along that edge towards CD without moving the ruler.

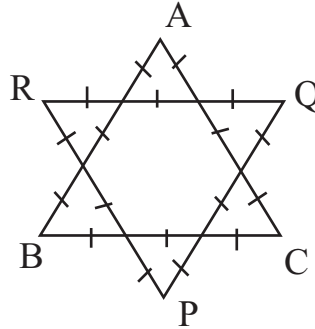


- (iv) If the edge of the set square that coincided with AB
- ★ Coincides with CD what conclusions do you arrive at?
  - ★ If not what conclusions would you arrive at?

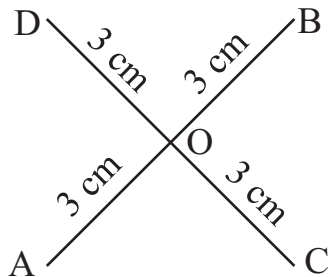
### Exercise 12.4

- (1) Find whether each of the following pairs of straight lines are parallel.

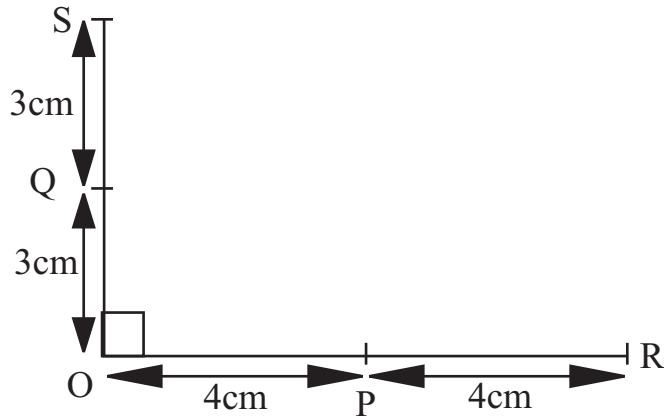
- (i) RQ and BC
- (ii) RP and AC
- (iii) PQ and BA



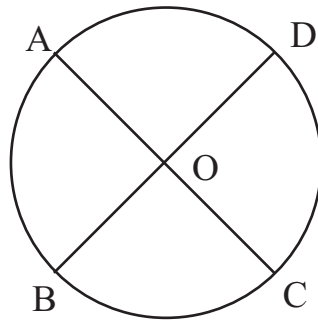
- (2) Draw a trapezium and mark the mid points of its sides as 'A', 'B', 'C' and 'D' in order. Join AB, BC, CD, and DA. Examine whether the opposite sides of the figure you get are parallel. According to your conclusion, what is the name of that figure?
- (3) Construct a figure similar to the following figure with the given measurements. Join AC and BD, and examine whether the lines AC and BD are parallel.



- (4) Construct a figure similar to the figure given on next page. Join PQ and RS and examine whether they are parallel.



- (5) Construct any circle with centre 'O'. Draw any two lines AC and BD through 'O' as in the figure. Join AB and CD and examine whether they are parallel.



### Summary

- ★ If the distance between two lines is constant, the two lines are said to be parallel.
- ★ The locus of a point moving equidistant from a straight line is a straight line parallel to the first straight line.
- ★ Parallel lines will never intersect.
- ★ Parallel lines can be drawn by using a set square and a ruler.
- ★ Determining whether two lines are parallel can be done by using a set square and a ruler.