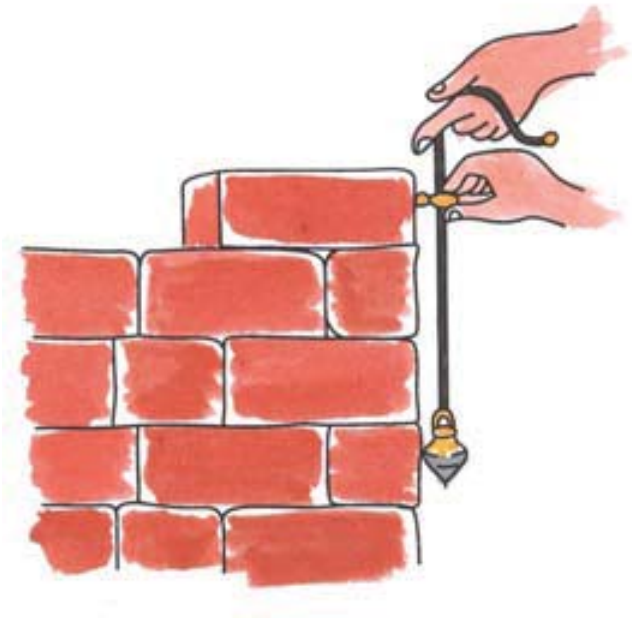
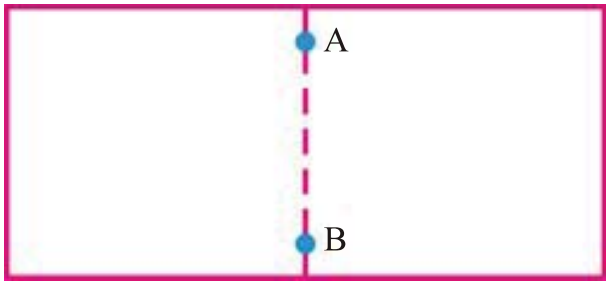
7 Perpendicular Lines

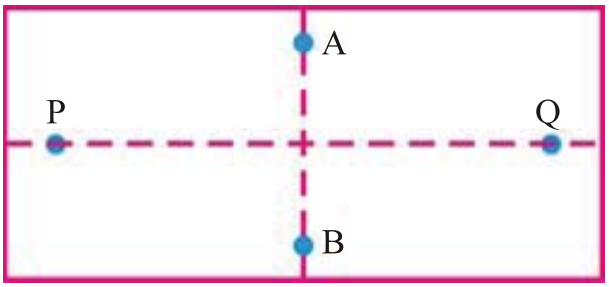
You have seen the building under construction. In it you have seen the worker used a string and a top. Do you know, with the help of a string and a top, what he would see ? With the help of top he decided that the wall and the floor is exactly at right angle or not.



Activity 1 :

Take a rectangular paper. As shown in the figure, fold it vertically from the middle so that it makes a half. Unfold the paper and the point at which the paper folds, give names A and B. Again fold the paper horizontally so that paper is divided into another two parts. Again unfold the paper and the point at which paper folds give names P and Q.





You can see that both folded part intersects each other at right angle. i.e. $\overline{AB}$ and $\overline{PQ}$ are mutually perpendicular.

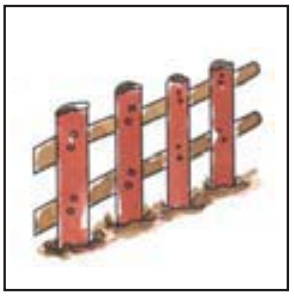
Activity 2 :

On the given graph paper, draw lines so that it intersects each other at right angle and name it.

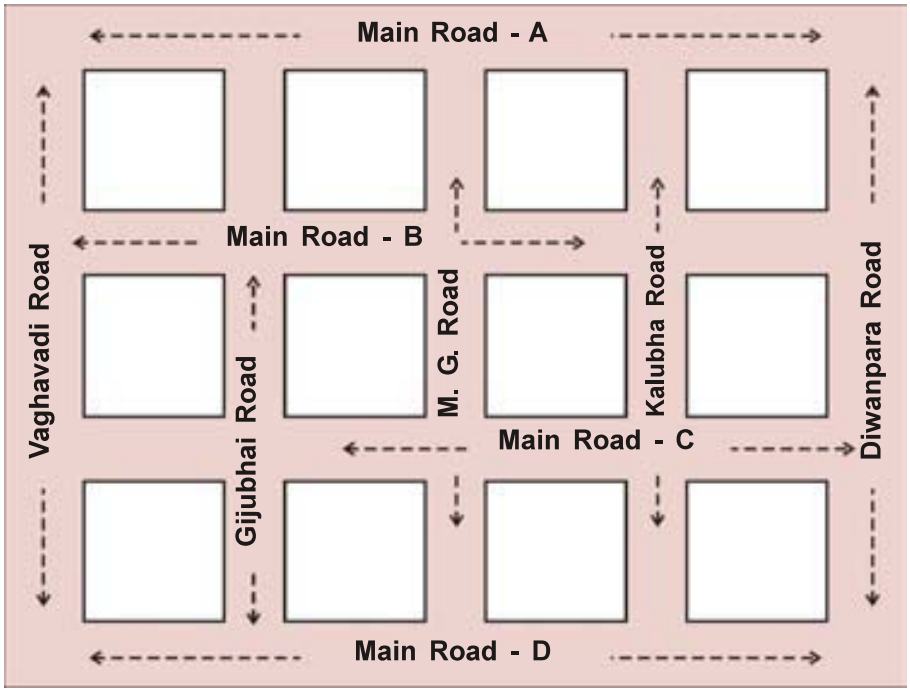
Practice 1

1. See the following pictures, from these pictures, tick mark (✓) which has mutually perpendicular :



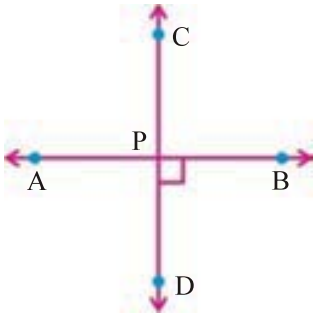
2.



In the above picture, think that which roads are mutually perpendicular to each other ?

Perpendicular lines :

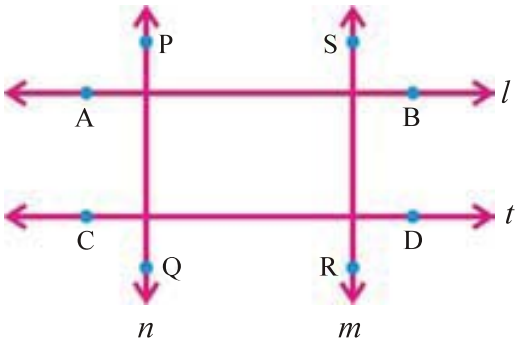
See the adjoining figure carefully. In it, two lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersects each other at point P, in which $\angle P$ is right angle. Thus, both lines intersect each other at right angles.



- **Two lines intersecting at right angle is called perpendicular lines.**

$\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are mutually perpendicular lines in above figure. Symbolically it is written as $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ or $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$. (Read : Line AB perpendicular to line CD or line CD perpendicular to line AB.)

Activity 3 : Which lines are perpendicular to each other in the given figure ? Write symbolically.



Activity 4 : Think

(1) In your classroom, where do you see perpendicular lines ?

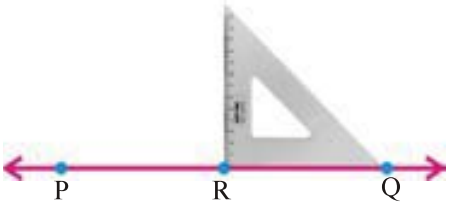
(2) In your notebook, two adjacent lines seems perpendicular or not ?

To draw perpendicular lines with set square :

Illustration 1 : Point R is given on $\overleftrightarrow{PQ}$. Draw perpendicular line through point R.

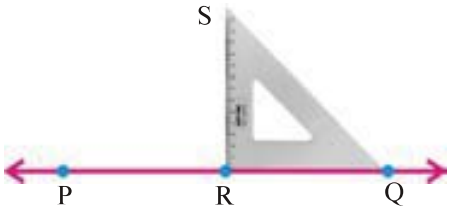
Steps :

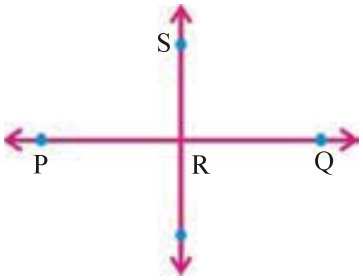
- Take point R on a line $\overleftrightarrow{PQ}$.



- Now, adjust the set square on $\overleftrightarrow{PQ}$ such that its right angle point touches point R and edge is exactly on the line.

- Take a point S, on vertical edge of set square, on the paper.
- Now, take away set square.





- By joining the point R, which is on $\overleftrightarrow{PQ}$ and a point S, which is outside the line, draw $\overleftrightarrow{SR}$.

Thus, with the help of set square, a perpendicular $\overleftrightarrow{SR}$ is drawn through point R of $\overleftrightarrow{PQ}$.

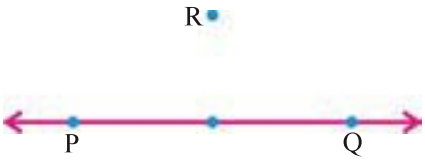
1. Point P is given on $\overleftrightarrow{AB}$. With the help of set square, draw line $\overleftrightarrow{PQ}$ passing through point P and perpendicular to $\overleftrightarrow{AB}$.

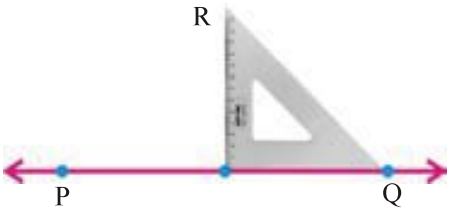
2. Take a point R on $\overleftrightarrow{XY}$ and with set square draw perpendicular line $\overleftrightarrow{RN}$ passing through point R of $\overleftrightarrow{XY}$.

Illustration 2 : $\overleftrightarrow{PQ}$ is given. Point R is outside it. With the help of set square draw $\overleftrightarrow{RS}$ which is perpendicular to $\overleftrightarrow{PQ}$ and passing through point R.

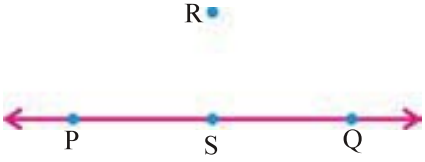
Steps :

- First of all, draw $\overleftrightarrow{PQ}$ and take a point R outside it.

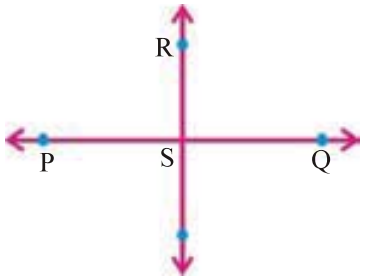




- Arrange the set square, such that one edge is on $\overleftrightarrow{PQ}$ and second edge is on point R.
- Give the name S at the point where right angled portion of set square touches.



- Now, take away set square.



- With the help of scale, draw the line passing through point R, outside the $\overleftrightarrow{PQ}$ and point S, on the $\overleftrightarrow{PQ}$.

Thus, perpendicular $\overleftrightarrow{SR}$ is drawn through a point R, outside the $\overleftrightarrow{PQ}$ with set square.

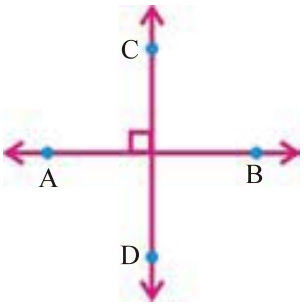
Practice 3

1. Point P is given outside $\overleftrightarrow{XY}$. With the help of set square draw $\overleftrightarrow{PQ}$, perpendicular to $\overleftrightarrow{XY}$.
2. Take a point J outside the $\overleftrightarrow{AB}$, draw perpendicular $\overleftrightarrow{JK}$ on $\overleftrightarrow{AB}$ with the help of set square.

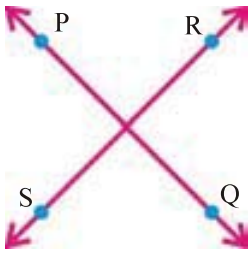
Exercise

1. Write in symbol, the following figures in the form of perpendicular :

(1)



(2)



2. Point O is given on $\overleftrightarrow{MN}$. Draw perpendicular line to $\overleftrightarrow{MN}$ and passing through point O with set square.

3. Point J is given outside $\overleftrightarrow{RS}$. Draw perpendicular $\overleftrightarrow{JK}$ to $\overleftrightarrow{RS}$ with set square.

- **No, maths is not hard :** Generally, students believed that, maths is hard subject. But it is not true.
  - Maths teaching is making easier with the help of mathematics tools, entertainment activities, games on logic, mathematics magic box, etc.