Exercise 27.1

Q 1. Plot the points (5, 0), (5, 1), (5, 8). Do they lie on a line? What is your observation?

SOLUTION:

Take a point O on the graph paper and draw horizontal and vertical lines OX and OY respectively.

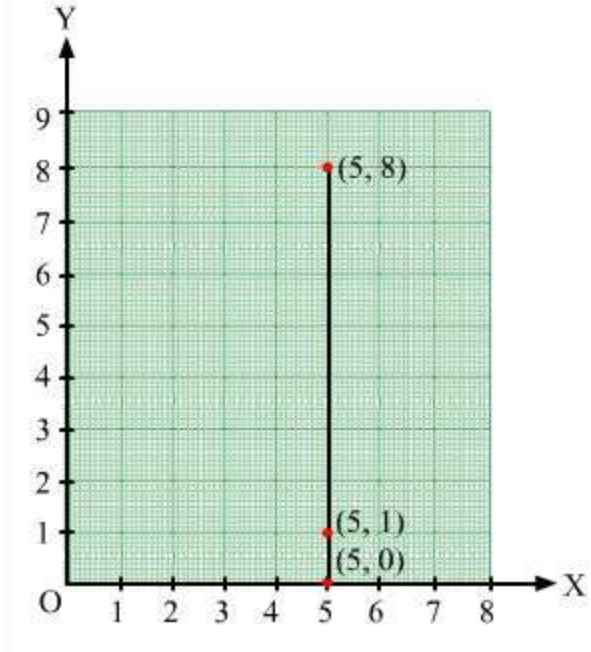
Then, let on the x-axis and y-axis 1 cm represents 1 unit.

In order to plot point (5, 0), we start from the origin O and move 5 cm along OX. The point we arrive at is point (5,0).

To plot point (5, 1), we move 5 cm along OX and 1 cm along OY. The point we arrive at is point (5,1).

To plot point (5,8), we move 5 cm along OX and 8 cm along OY. The point we arrive at is point (5,8).

From the graph below, it can be seen that the points lie on a line parallel to the y-axis. This is because they have the same x-coordinate.



Q 2. Plot the points (2, 8), (7, 8) and (12, 8). Join these points in pairs. Do they lie on a line? What do you observe?

SOLUTION:

Take a point O on the graph paper and draw the horizontal and vertical lines OX and OY respectively.

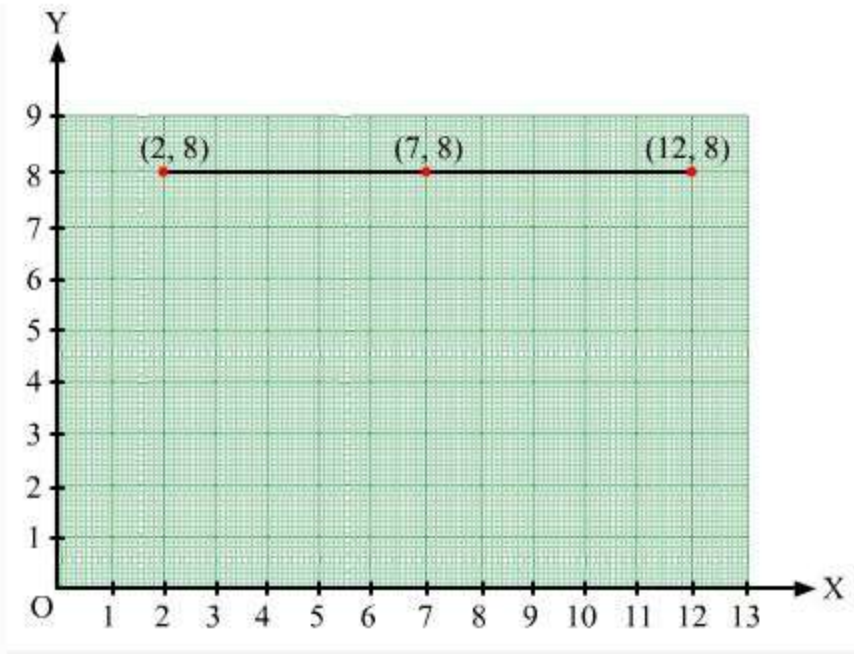
Then, let on the x-axis and y axis 1 cm represents 1 unit.

In order to plot point (2, 8), we start from the origin O and move 8 cm along OX. The point we arrive at is (2, 8).

To plot point (7, 8), we move 7 cm along OX and 8 cm along OY. The point we arrive at is (7, 8).

To plot point (12, 8), we move 12 cm along OX and 8 cm along OY. The point we arrive at is (12,8).

From the graph below, it can be seen that the points lie on a line parallel to x-axis because they have the same y-coordinate.



Q 3. Locate the points:

(i) (1, 1), (1, 2), (1, 3), (1, 4) (ii) (2, 1), (2, 2), (2, 3), (2, 4)

(iii) (1, 3), (2, 3), (3, 3), (4, 3) (iii) (1, 4), (2, 4), (3, 4), (4, 4)

SOLUTION:

(i) In order to plot these points, the given steps are to be followed:

Take a point O on a graph paper and draw horizontal and vertical lines OX and OY respectively.

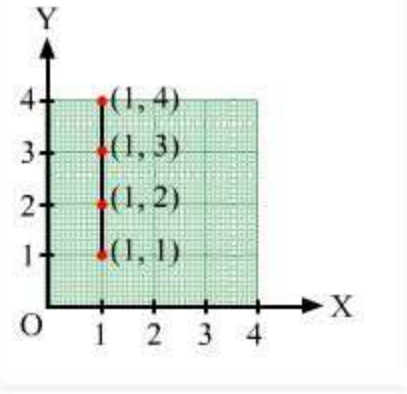
Then, let on x-axis and y-axis 1 cm represents 1 unit.

In order to plot point (1, 1), we start from the origin O and move 1 cm along OX and 1 cm along OY. The point we arrive at is (1, 1).

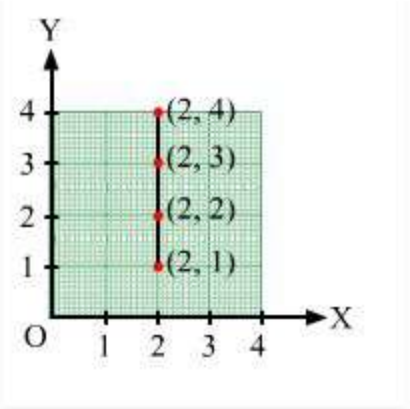
To plot point (1, 2), we move 1 cm along OX and 2 cm along OY. The point we arrive at is (1, 2).

To plot point (1, 3), we move 1 cm along OX and 3 cm along OY. The point we arrive at is (1, 3).

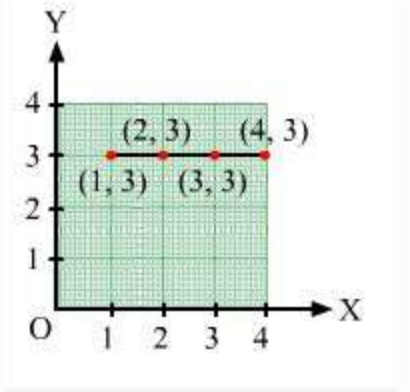
To plot point (1, 4), we move 1 cm along OX and 4 cm along OY. The point we arrive at is (1, 4).



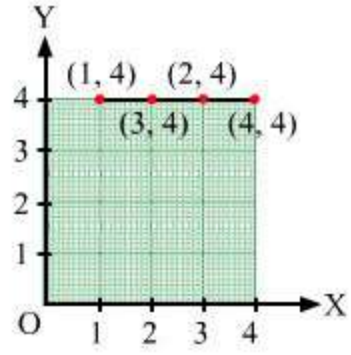
(ii) Follow the steps mentioned in point (i).



(iii) Follow the steps mentioned in point (i).



(iv) Follow the steps mentioned in point (i).



Q 4.Find the coordinates of points A, B, C, D in Fig. 27.7 :

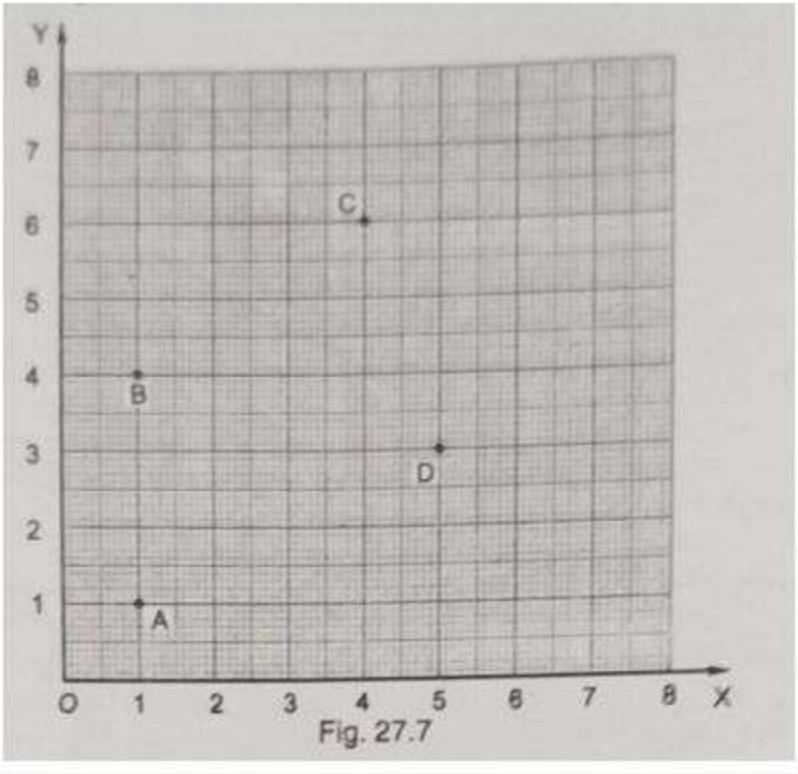
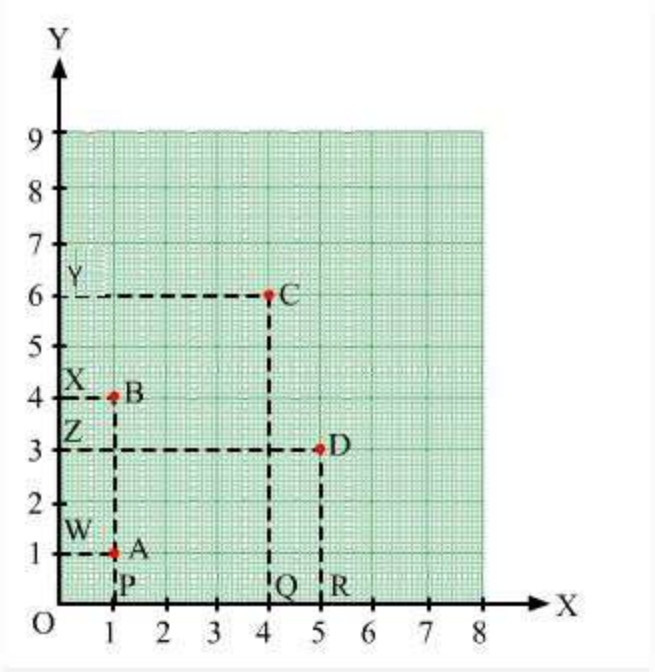


Fig. 27.7

SOLUTION:



Draw perpendiculars AP, BP, CQ and DR from A, B, C and D on the x-axis. Also, draw perpendiculars AW, BX, CY and DZ on the y-axis.

From the figure, we have:

AW = 1 unit and AP= 1 unit

So, the coordinates of vertex A are (1, 1).

Similarly, BX=1 unit and BP= 4 units

So, the coordinates of vertex B are (1, 4).

CY = 4 units and CQ= 6 units

So, the coordinates of vertex B are (4, 6).

DZ = 5 units and DR= 3 units

So, the coordinates of vertex B are (5, 3).

Q 5.Find the coordinates of points P, Q, R, and S in Fig. 27.8.

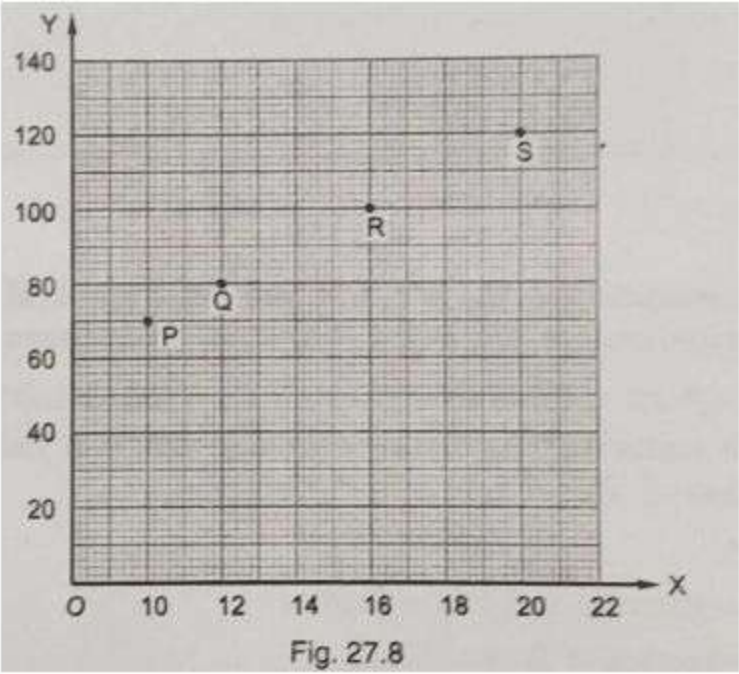
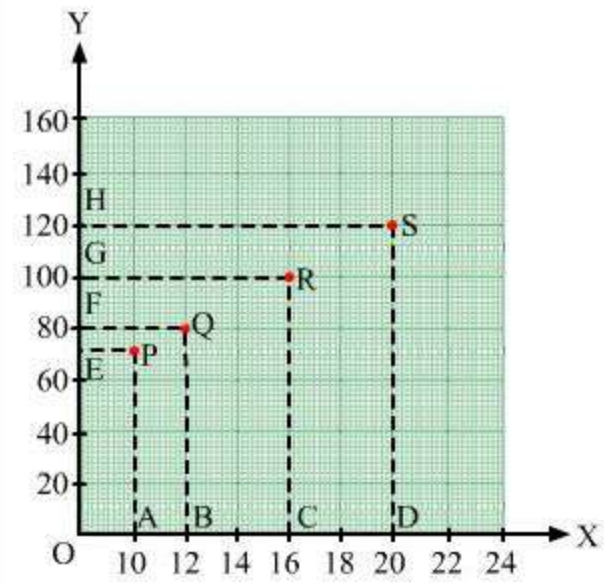


Fig. 27.8

SOLUTION:



Draw perpendiculars PA, QB, RC and SD from vertices P, Q, R and S on the x-axis. Also , draw perpendiculars PE, QF, RG, and SH on the y-axis from these points.

PE = 10 units and PA = 70 units

Therefore, the coordinates of vertex P are (10, 70).

QF = 12 units and QB = 80 units

Therefore, the coordinates of vertex Q are (12, 80).

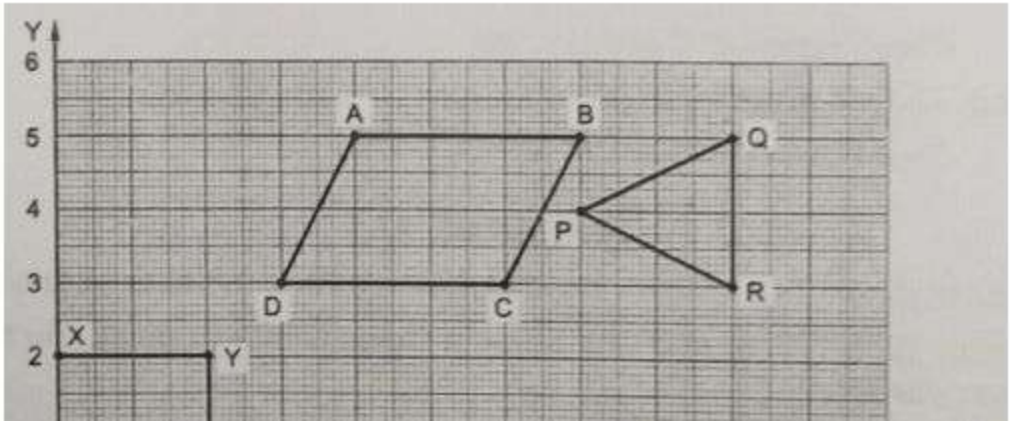
RG = 16 units and RC = 100 units

Therefore, the coordinates of vertex R are (16, 100).

SH = 20 units and SD = 120 units

Therefore, the coordinates of vertex S are (20, 120).

Q 6.Write the coordinates of each of the vertices of each polygon in Fig. 27.9 :



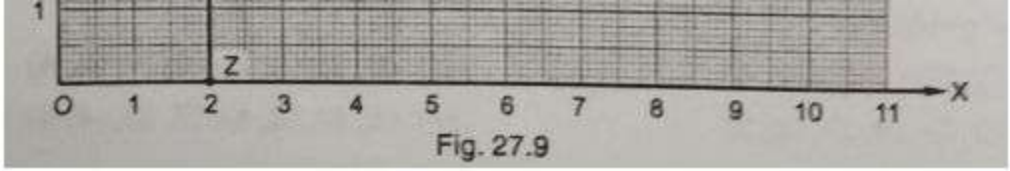
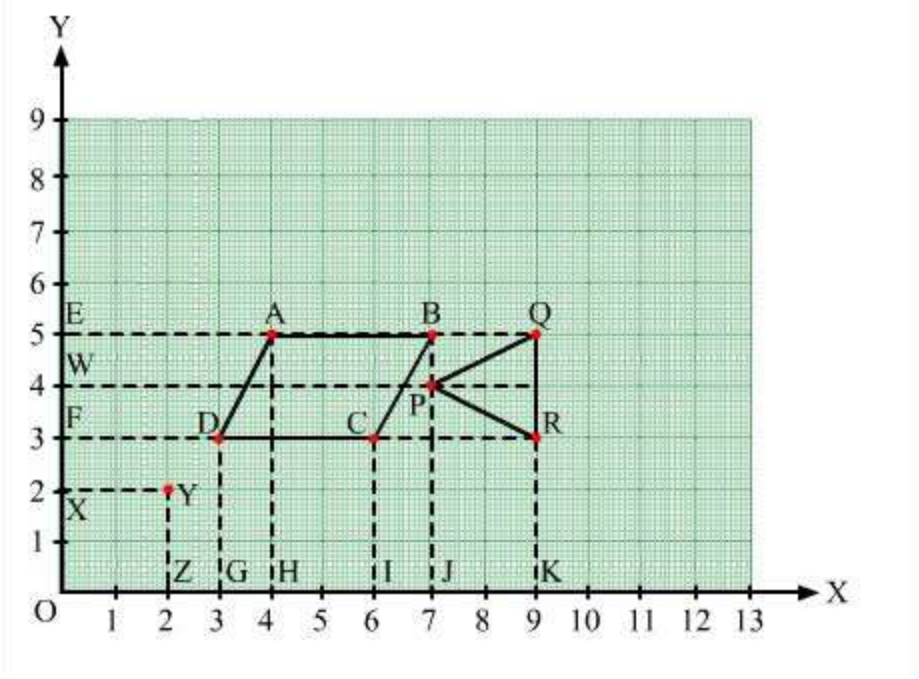


Fig. 27.9

SOLUTION:



From the figure, we have:

In polygon OXYZ:

O lies on the origin and the coordinates of the origin are (0, 0). So, the coordinates of O are (0, 0).

X lies on the y-axis. So, the x-coordinate is 0. Hence, the coordinate of X is (0, 2).

Also, YX is equal to 2 units and YZ is equal to 2 units. So, the coordinates of vertex Y are (2, 2).

Z lies on the x-axis. So, the y-coordinate is 0. Hence, the coordinates of Z are (2, 0).

In polygon ABCD:

Draw perpendiculars DG, AH, CI and BJ from A, B, C and D on the x-axis.

Also, draw perpendiculars DF, AE, CF and BE from A, B, C and D on the y-axis.

Now, from the figure:

DF = 3 units and DG = 3 units

Therefore, the coordinates of D are (3, 3).

AE = 4 units and AH = 5 units

Therefore, the coordinates of A are (4, 5).

CF = 6 units and CI = 3 units

Therefore, the coordinates of C are (6, 3).

BE = 7 units and BJ = 5 units

Therefore, the coordinates of B are (7, 5).

In polygon PQR:

Draw perpendiculars PJ, QK and RK from P, Q and R on the x-axis.

Also, draw perpendiculars PW, QE and RF from P, Q and R on the y-axis.

Now, from the figure:

PW = 7 units and PJ = 4 units

Therefore, the coordinates of P are (7, 4).

QE = 9 units and QK = 5 units

Therefore, the coordinates of Q are (9, 5).

RF = 9 units and RK = 3 units

Therefore, the coordinates of R are (9, 3).

Q 7. Decide which of the following statements is true and which is false. Give reasons for your answer.

(i) A point whose x-coordinate is zero, will lie on the y-axis.

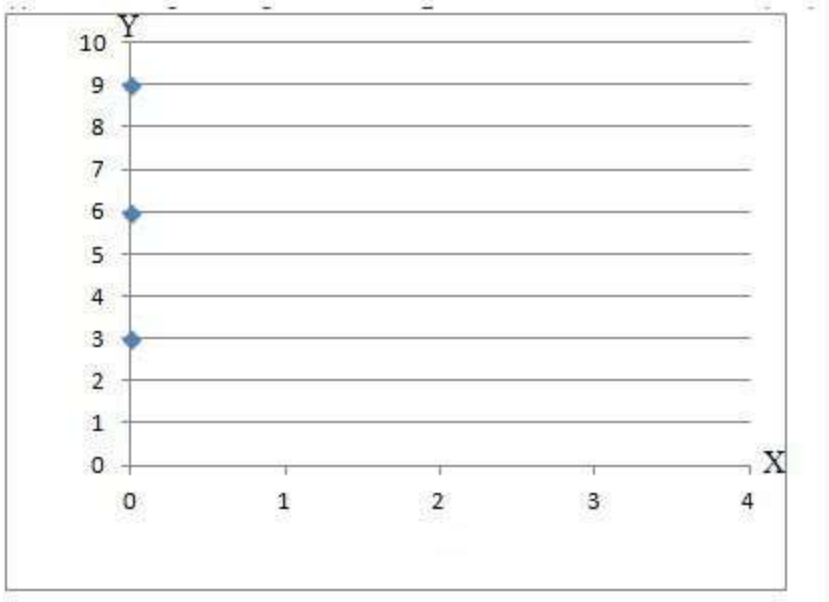
(ii) A point whose y-coordinate is zero, will lie on x-axis.

(iii) The coordinates of the origin are (0, 0)

(iv) Points whose x and y coordinates are equal, lie on a line passing through the origin.

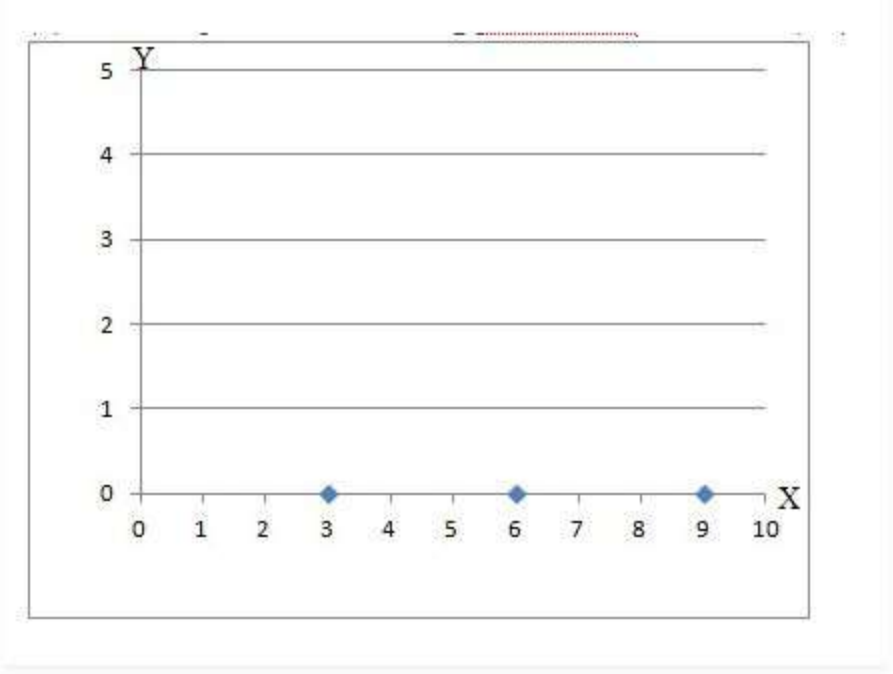
SOLUTION:

(i) The examples of points having x-coordinate as zero are (0,3), (0,6), (0,9). This can be represented in the following manner :



From the figure, it can be seen that these points lie on the y-axis. Hence, the statement is true.

(ii) The examples of points having y-coordinate as zero are (3,0), (6,0), (9,0). This can be represented in the following manner:



From the figure above, it can be seen that these points lie on the x-axis. Hence, the statement is true.

(iii) The origin divides each of these axes into a positive and a negative semi-axis. The coordinates of the origin are always are zero, i.e. (0,0). Thus, the statement is true.

(iv) The examples of points having equal x and y coordinates are (0,0), (1,1), (2,2), etc. If these points are joined, they will lie on a line passing through the coordinates (0,0). Thus, the statement is true.

Exercise 27.2

Q 1. The following table shows the number of patients discharged from a hospital with HIV diagnosis in different years:

Years:	2002	2003	2004	2005	2006
Number of patients:	150	170	195	225	230

Represent this information by a graph.

SOLUTION:

Here, year is an independent variable and the number of patients is a dependent variable. So, we take years on the x-axis and the number of patients on the y-axis.

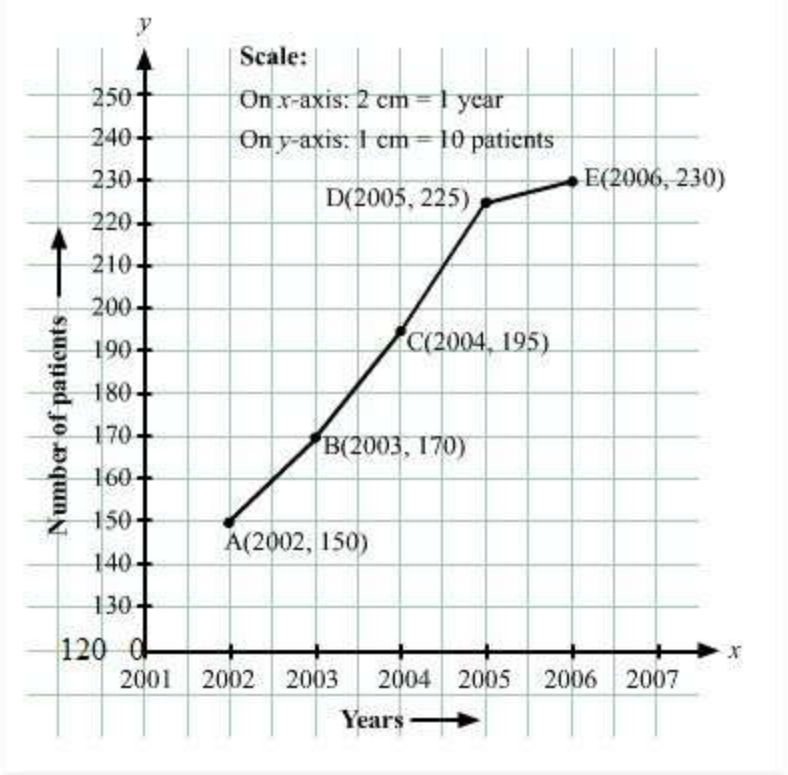
Let us choose the following scale:

On x-axis: 2 cm = 1 year

On y-axis: 1 cm = 10 patients

Also, let us assume that on the x-axis, origin (O) represents 2001 and on the y-axis, origin (O) represents 120, i.e. O (2001, 120).

Now, let us plot (2002, 150), (2003, 170), (2004, 195), (2005, 225), (2006, 230). These points are joined to get the graph representing the given information as shown in the figure below.



Q 2. The following table shows the amount of rice grown by a farmer in different years:

Years:	2000	2001	2002	2003	2004	2005	2006
Rice grown (in quintals):	200	180	240	260	250	200	270

Plot a graph to illustrate this information.

SOLUTION:

Here, the year is an independent variable and quantity of rice grown is a dependent variable. So, we take years on the x-axis and quantity of rice grown on the y-axis.

Let us choose the following scale:

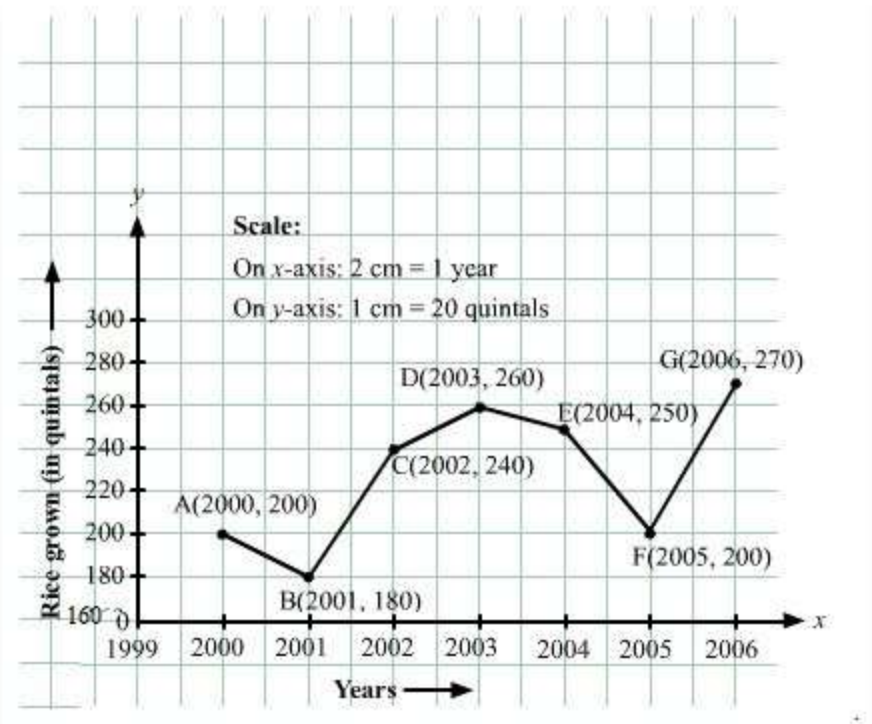
On x-axis: 2 cm = 1 year

On y-axis: 1 cm = 20 quintals

Let us assume that the origin O represents the coordinates (1999, 160).

Now, let us plot (2000, 200), (2001, 180), (2002, 240), (2003, 260), (2004, 250),(2005, 200),(2006, 270).

These points are joined to get the graph representing the given information as shown in the figure below.



Q 3. The following table gives the information regarding the number of persons employed to a piece of work and time taken to complete the work:

Number of persons:	2	4	6	8
Time taken (in days):	12	6	4	3

Plot a graph of this information.

SOLUTION:

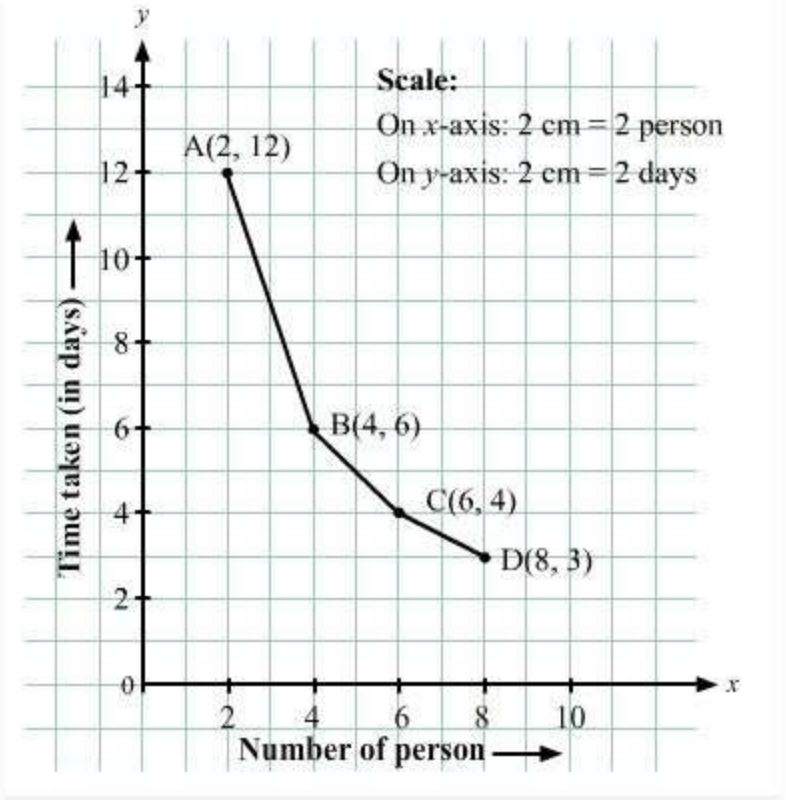
Here, the number of persons is an independent variable and time taken is a dependent variable. So, we take the number of persons on the x-axis and time taken on the y-axis.

Let us choose the following scale:

On x-axis: 2 cm = 2 persons

On y-axis: 2 cm = 2 days

Now, let us plot (2, 12), (4, 6), (6, 4), (8, 3). These points are joined to get the graph representing the given information as shown in the figure below.



Q 4. The following table gives the information regarding the length of a side of a square and its area:

Length of a side (in cm):	1	2	3	4	5
Area of square (in cm^2):	1	4	9	16	25

Draw a graph to illustrate this information.

SOLUTION:

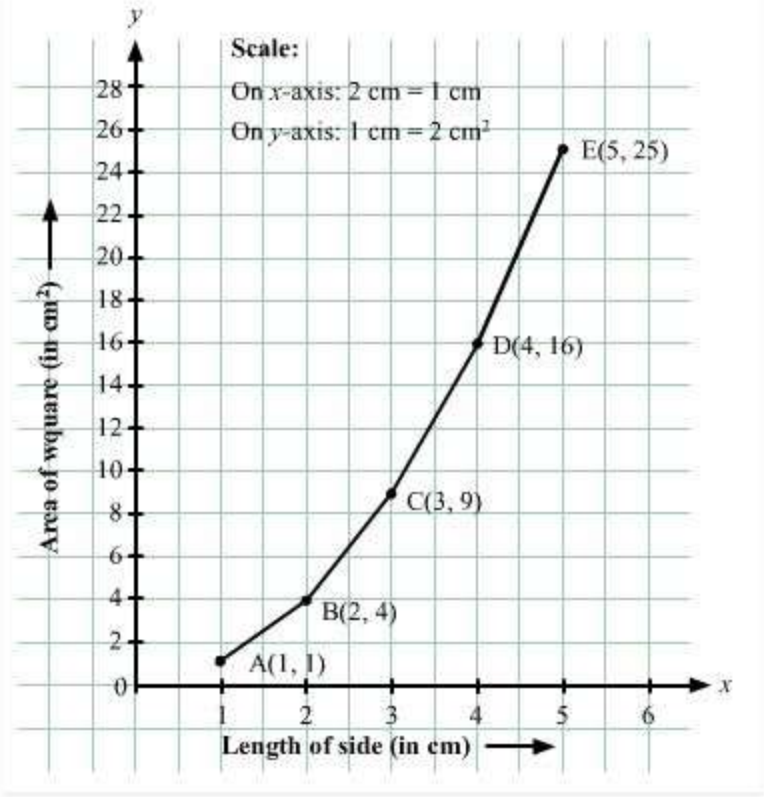
Here, length of a side is an independent variable and area of the square is a dependent variable. So, we take the length of a side on the x-axis and area of the square on the y-axis.

Let us choose the following scale:

On x-axis: 2 cm = 1 cm

On y-axis: 1 cm = 2 cm^2

Now we plot (1,1), (2,4), (3,9), (4,16), (5,25). These points are joined to get the graph representing the given information as shown in the figure below.



Q 5. The following table shows the sales of a commodity during its years 2000 to 2006.

Years:	2000	2001	2002	2003	2004	2005	2006
Sales (in lakhs of Rs):	1.5	1.8	2.4	3.2	5.4	7.8	8.6

Draw a graph of this information.

SOLUTION:

Here, year is an independent variable and sales is a dependent variable. So, we take year on the x-axis and sales on the y-axis.

Let us choose the following scale:

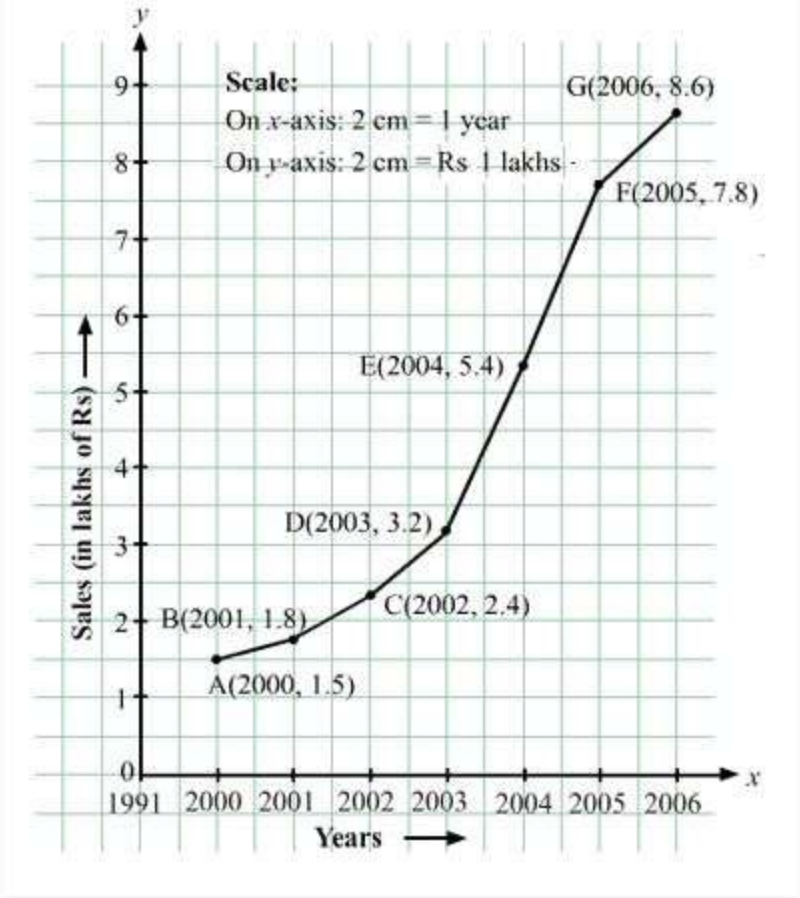
On x-axis: 2 cm = 1 year

On y-axis: 2 cm = 1 lakh rupees

Assume that on x-axis, origin (O) represents 1991.

So, the coordinates of O are (1991,0).

Now, let us plot (2000, 1.5), (2001, 1.8), (2002, 2.4), (2003, 3.2), (2004, 5.4), (2005, 7.8) and (2006, 8.6). These points are joined to get the graph representing the given information as shown in the figure below.



Q 6. Draw the temperature-time graph in each of the following cases:

(i)

Time (in hours):	7:00	9:00	11:00	13:00	15:00	17:00	19:00	21:00
Temperature (°F) in:	100	101	104	102	100	99	100	98

(ii)

Time (in hours):	8:00	10:00	12:00	14:00	16:00	18:00	20:00
Temperature (°F) in:	100	101	104	103	99	98	100

SOLUTION:

Here, time is an independent variable and temperature is a dependent variable. So, we take time on the x-axis and temperature on the y-axis.

Let us choose the following scale:

For point (i):

On x-axis: 1 cm = 1 hours

On y-axis: 1 cm = 2°F

For point (ii):

On x-axis: 2 cm = 2 hours

On y-axis: 1 cm = 1°F

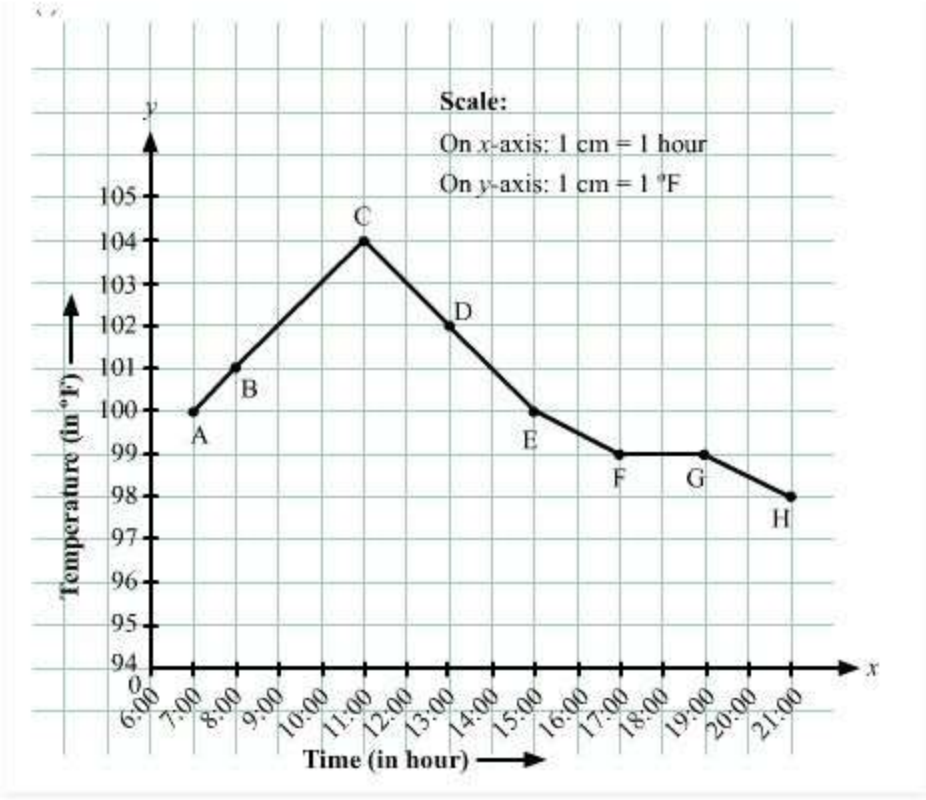
Let us assume that on the x-axis, the coordinate of origin is 6:00.

On y-axis, the coordinate of origin is 94°F .

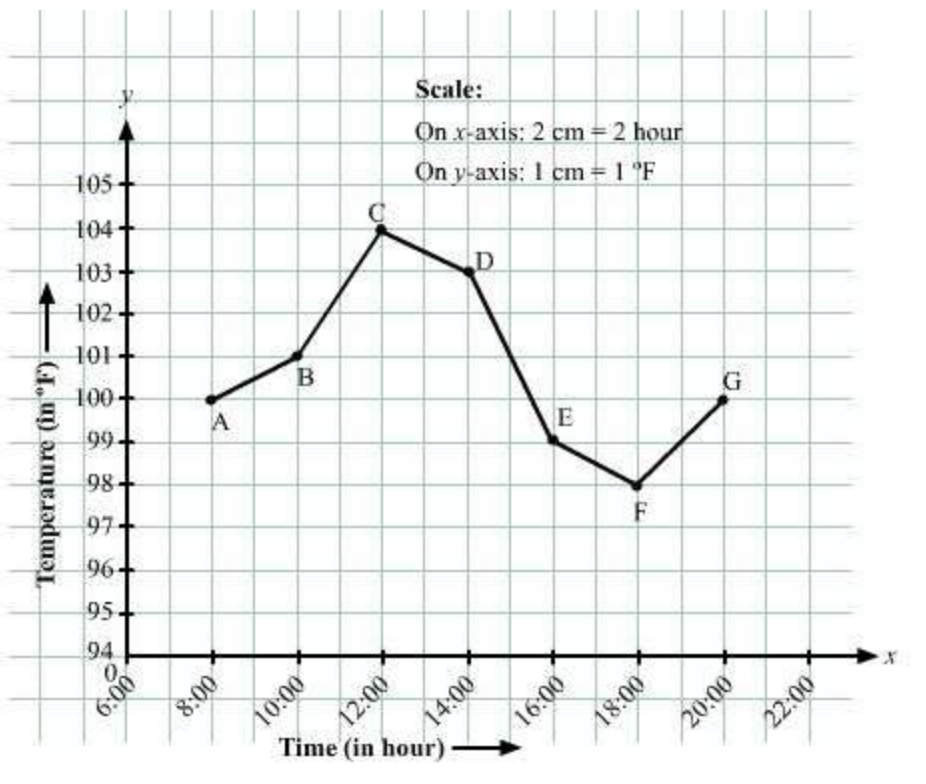
So, the coordinates of 0 are (6:00, 94).

Now, let us plot (7:00, 100), (9:00, 101), (11:00, 104),..(21:00, 98) for point (i) and (8:00, 100), (10:00, 101), (12:00, 104) ..... (20:00, 100) for point (ii). These points are joined to get the graphs representing the given information as shown in the figures below.

(i)


Scale:
On x-axis: 1 cm = 1 hour
On y-axis: 1 cm = 1 °F
y
x
Temperature (in °F)
Time (in hour)
105
104
103
102
101
100
99
98
97
96
95
94
0
A
B
C
D
E
F
G
H
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00

(ii)


Scale:
On x-axis: 2 cm = 2 hour
On y-axis: 1 cm = 1 °F
y
x
Temperature (in °F)
Time (in hour)
105
104
103
102
101
100
99
98
97
96
95
94
0
A
B
C
D
E
F
G
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00

Q 7. Draw the velocity-time graph from the following data:

Time (in hours):	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00
Speed (in km/hr):	30	45	60	50	70	50	40	45

SOLUTION:

Here, time is an independent variable and speed is a dependent variable. So, we take time on the x-axis and speed on the y-axis.

Let us choose the following scale:

On x-axis: 2 big division = 1 hour

On y-axis: 1 big division = 10 km/hr

Let us assume that on the x-axis, the coordinate of origin (O) is 7:00.

So, the coordinates of O are (7:00,0).

Now, let us plot (7:00,30), (8:00,45), (9:00,60), (10:00,50), (11:00,70), (12:00,50), (13:00,40), (14:00,45). These points are joined to get the graph representing the given information as shown in the figure below.

Q 8. The runs scored by a cricket team in first 15 overs are given below:

Overs:	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
Runs:	2	1	4	2	6	8	10	21	5	8	3	2	6	8	12

Draw the graph representing the above data in two different ways as a graph and a bar chart.

SOLUTION:

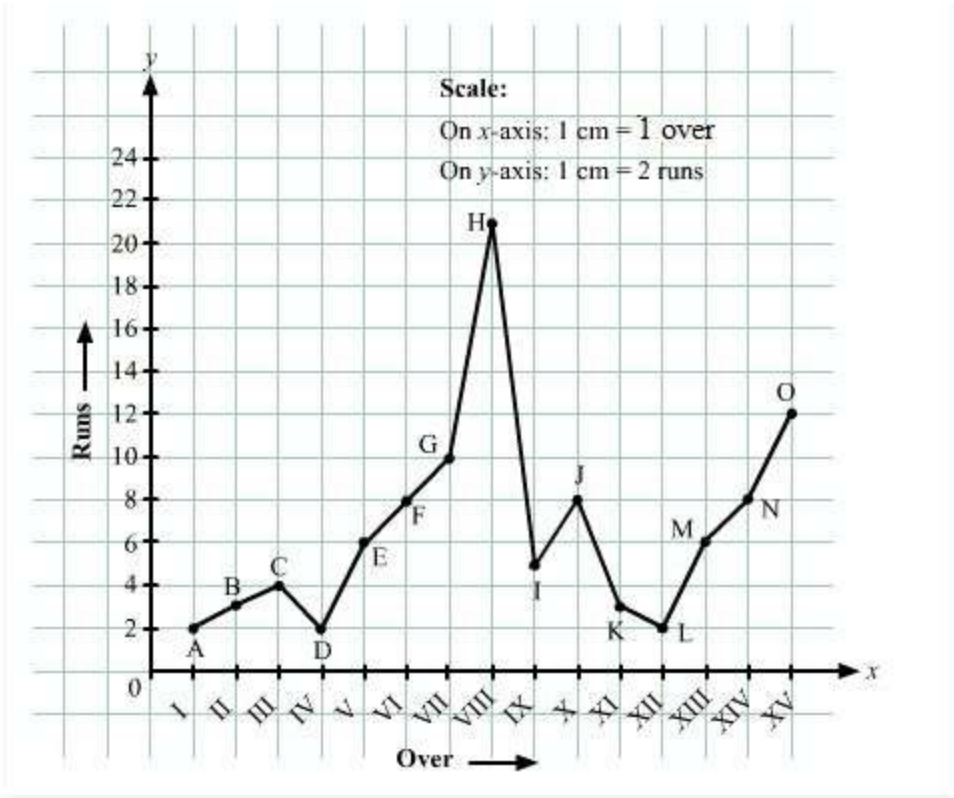
Here, over is an independent variable and run is a dependent variable. So, we takeovers on the x-axis and runs the on y-axis.

Let us choose the following scale:

On x-axis: 1 cm = 1 over

On y-axis: 1 cm = 2 runs

Now, let us plot (I,2), (II,1), (III,4) (XV,12). These points are joined to get the graph representing the given information as shown in the figure below.



Q 9. The runs scored by two teams A and B in first 10 overs are given below:

Overs:	I	II	III	IV	V	VI	VII	VIII	IX	X
Team A:	2	1	8	9	4	5	6	10	6	2
Team B:	5	6	2	10	5	6	3	4	8	10

Draw a graph depicting the data, making the graphs on the same axes in each case in two different ways as a graph and as a bar chart.

SOLUTION:

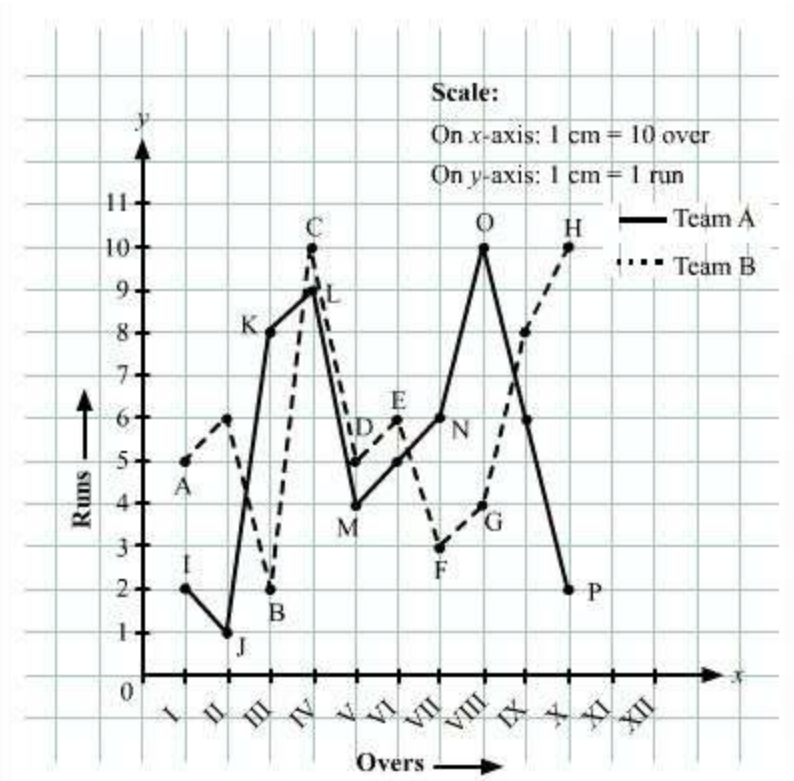
Here, over is an independent variable and run is a dependent variable. So, we takeovers on x-axis and runs on y-axis.

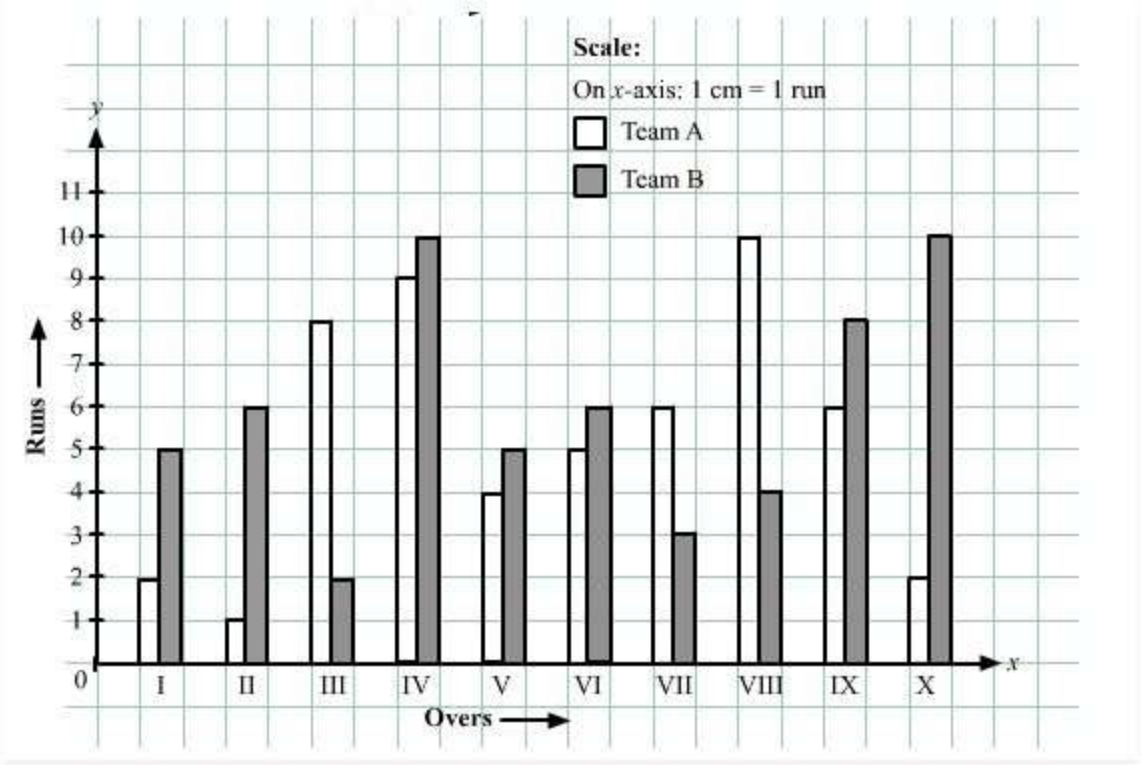
Let us choose the following scale:

On x-axis: 1 cm = 1 over

On y-axis: 1 cm = 1 run

Now, let us plot (I,2), (II,1), (III,8) (X,2) for team A and (I,5), (II,6), (III,8) ..... (X,10) for team B. These points are joined to get the graph representing the given information as shown in the figure below.




Scale:
On x-axis: 1 cm = 1 run
Team A
Team B
y
x
Runs
Overs
0
1
2
3
4
5
6
7
8
9
10
11
I
II
III
IV
V
VI
VII
VIII
IX
X