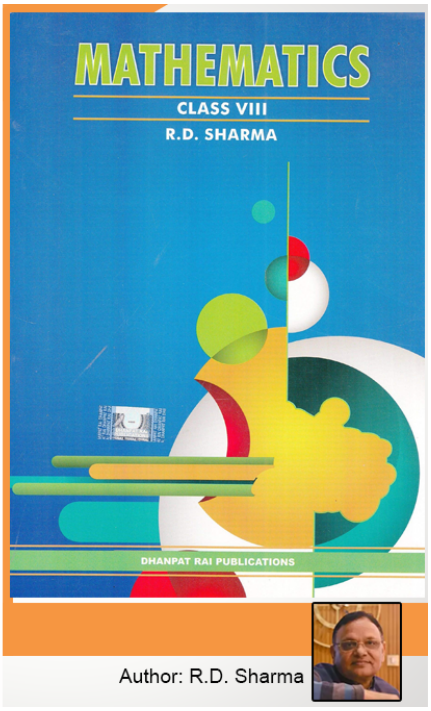
Class 8 - Chapter 27 Introduction to Graphs



RD Sharma Solutions for Class 8 Maths Chapter 27–Introduction to Graphs

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RD Sharma Solutions for Class 8 Maths Chapter 27–Introduction to Graphs

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EXERCISE 27.1 PAGE NO: 27.5

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

Solution:

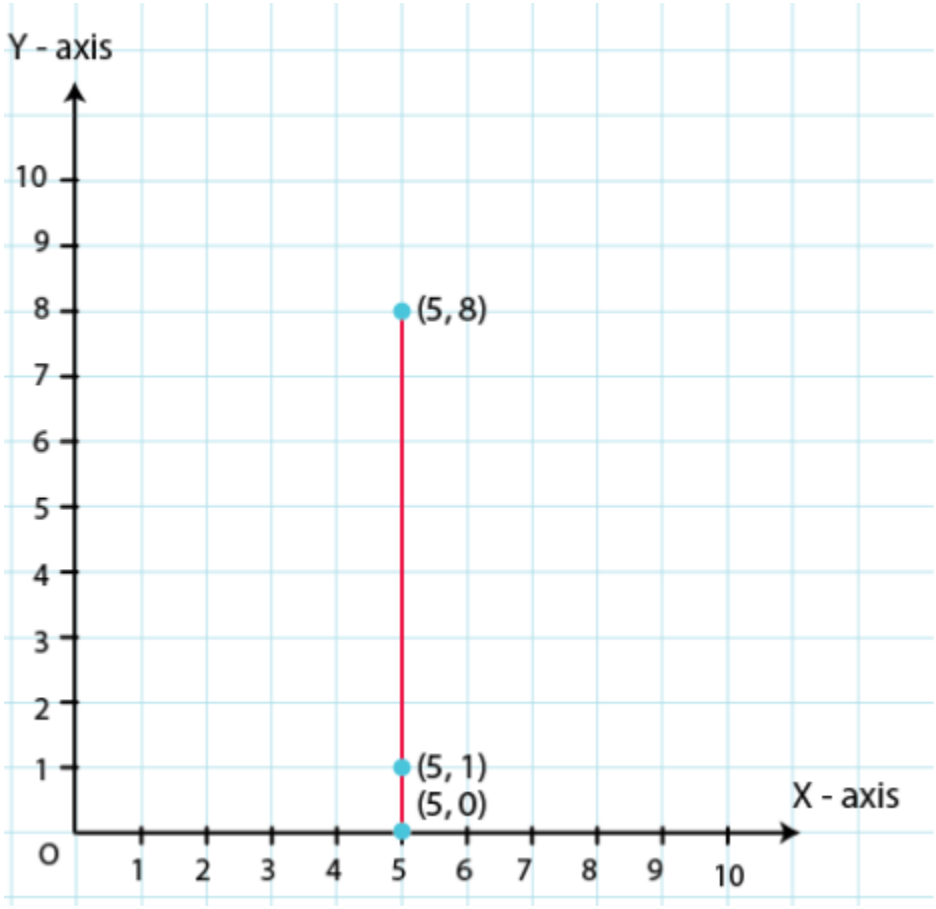
Take a point O on the graph paper and draw horizontal and vertical lines OX and OY respectively.

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

To plot point (5, 0), we start from the origin O and move 5 cm along X – axis. The point we arrive at is point (5, 0).

To plot point (5, 1), we move 5 cm along X – axis and 1 cm along Y – axis. The point we arrive at is point (5, 1).

To plot point (5, 8), we move 5 cm along X – axis and 8 cm along Y – axis. The point we arrive at is point (5, 8).



From the above graph, we observe that all points are having same X – coordinates, it can be seen that the points lie on a line parallel to the y-axis. Hence all points lie on the same line.

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:

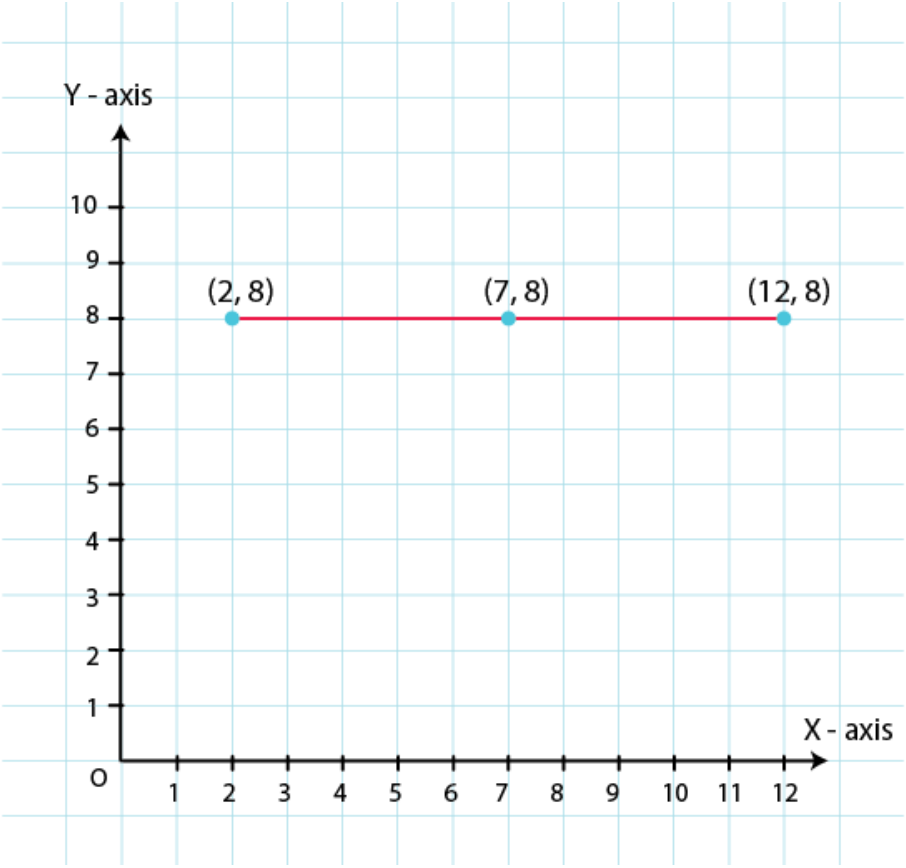
Take a point O on the graph paper and draw the horizontal and vertical lines OX and OY respectively.

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 X – axis. The point we arrive at is (2, 8).

To plot point (7, 8), we move 7 cm along X – axis and 8 cm along Y – axis. The point we arrive at is (7, 8).

To plot point (12, 8), we move 12 cm along X – axis and 8 cm along Y – axis. The point we arrive at is (12, 8).



From the above graph, we observe that all points are having same Y – coordinates, it can be seen that the points lie on a line parallel to the x-axis. Hence all points lie on the same line.

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)

(iv) (1, 4), (2, 4), (3, 4), (4, 4,)

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Solution:

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

To plot these points,

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

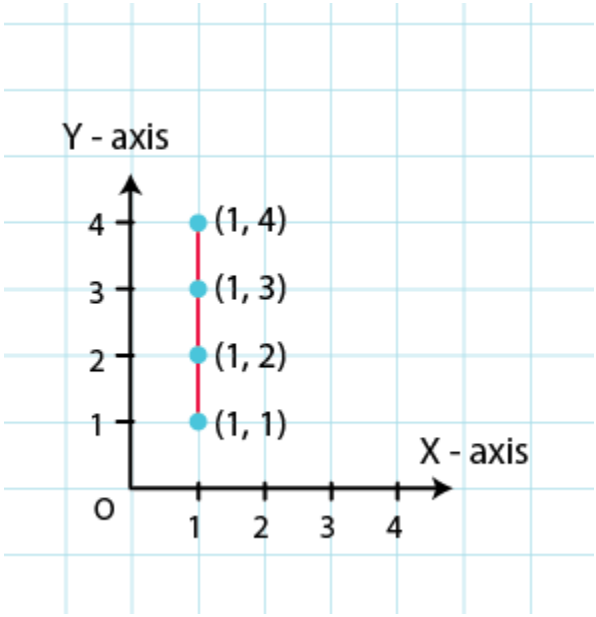
Then, let on x-axis and y-axis 1 cm represents 1 unit.

To plot point (1, 1), we start from the origin O and move 1 cm along X – axis and 1 cm along Y – axis. The point we arrive at is (1, 1).

To plot point (1, 2), we move 1 cm along X – axis and 2 cm along Y – axis. The point we arrive at is (1, 2).

To plot point (1, 3), we move 1 cm along X – axis and 3 cm along Y – axis. The point we arrive at is (1, 3).

To plot point (1, 4), we move 1 cm along X – axis and 4 cm along Y – axis. The point we arrive at is (1, 4)



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

To plot these points,

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

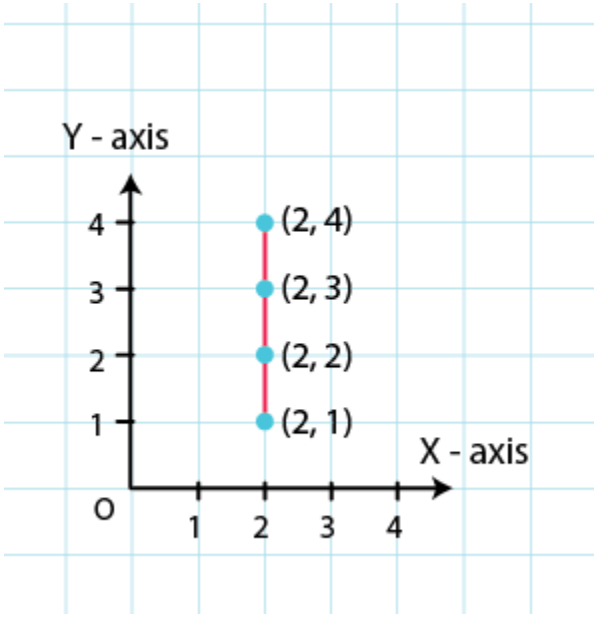
Then, let on x-axis and y-axis 1 cm represents 1 unit.

To plot point (2, 1), we move 2 cm along X – axis and 1 cm along Y – axis. The point we arrive at is (2, 1).

To plot point (2, 2), we move 2 cm along X – axis and 2 cm along Y – axis. The point we arrive at is (2, 2).

To plot point (2, 3), we move 2 cm along X – axis and 3 cm along Y – axis. The point we arrive at is (2, 3).

To plot point (2, 4), we move 2 cm along X – axis and 4 cm along Y – axis. The point we arrive at is (2, 4).



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

To plot these points,

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

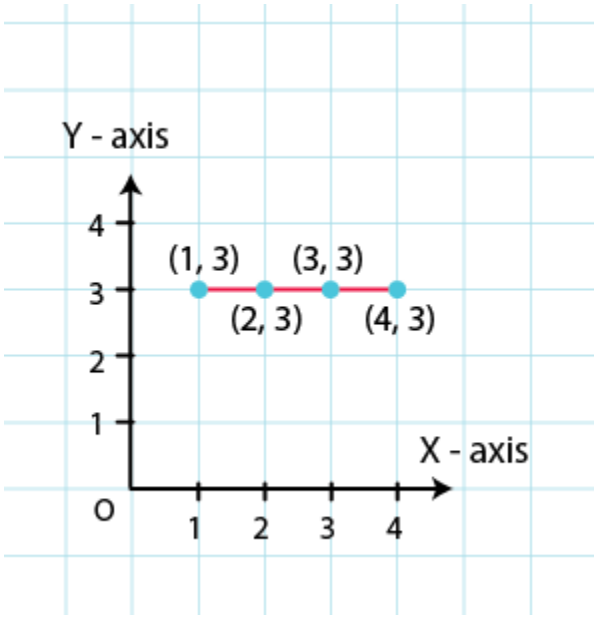
Then, let on x-axis and y-axis 1 cm represents 1 unit.

To plot point (1, 3), we move 1 cm along X – axis and 3 cm along Y – axis. The point we arrive at is (1, 3).

To plot point (2, 3), we move 2 cm along X – axis and 3 cm along Y – axis. The point we arrive at is (2, 3).

To plot point (3, 3), we move 3 cm along X – axis and 3 cm along Y – axis. The point we arrive at is (3, 3).

To plot point (4, 3), we move 4 0cm along X – axis and 3 cm along Y – axis. The point we arrive at is (4, 3).



(iv) (1, 4), (2, 4), (3, 4), (4, 4,)

To plot these points,

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

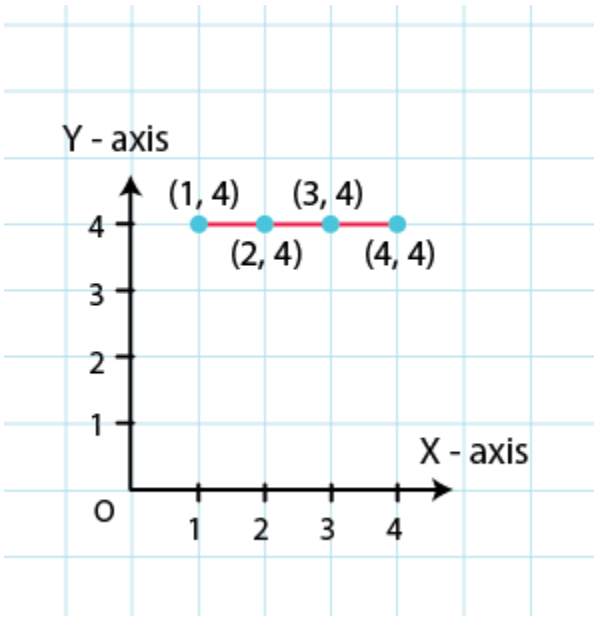
Then, let on x-axis and y-axis 1 cm represents 1 unit.

In order to plot point (1, 4), we move 1 cm along X – axis and 4 cm along Y – axis. The point we arrive at is (1, 4).

To plot point (2, 4), we move 2 cm along X – axis and 4 cm along Y – axis. The point we arrive at is (2, 4).

To plot point (3, 4), we move 3 cm along X – axis and 4 cm along Y- axis. The point we arrive at is (3, 4).

To plot point (4, 4), we move 4 cm along X – axis and 4 cm along Y – axis. The point we arrive at is (4, 4).



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

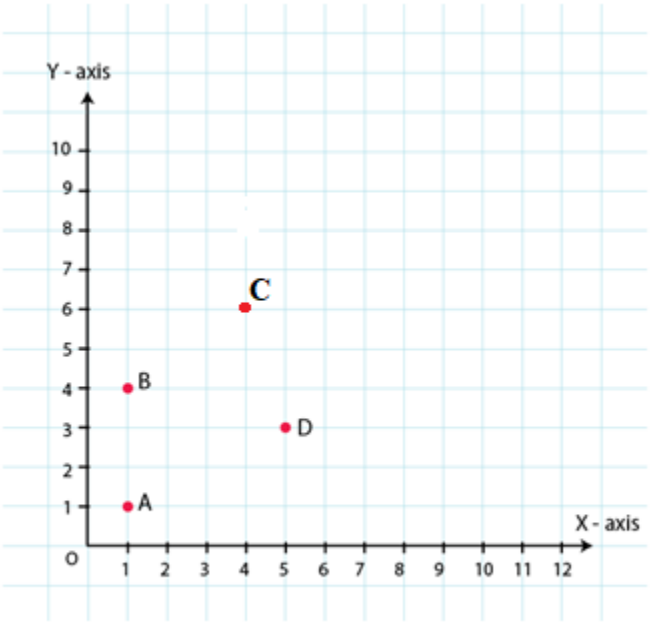


Fig. 27.7

Solution:

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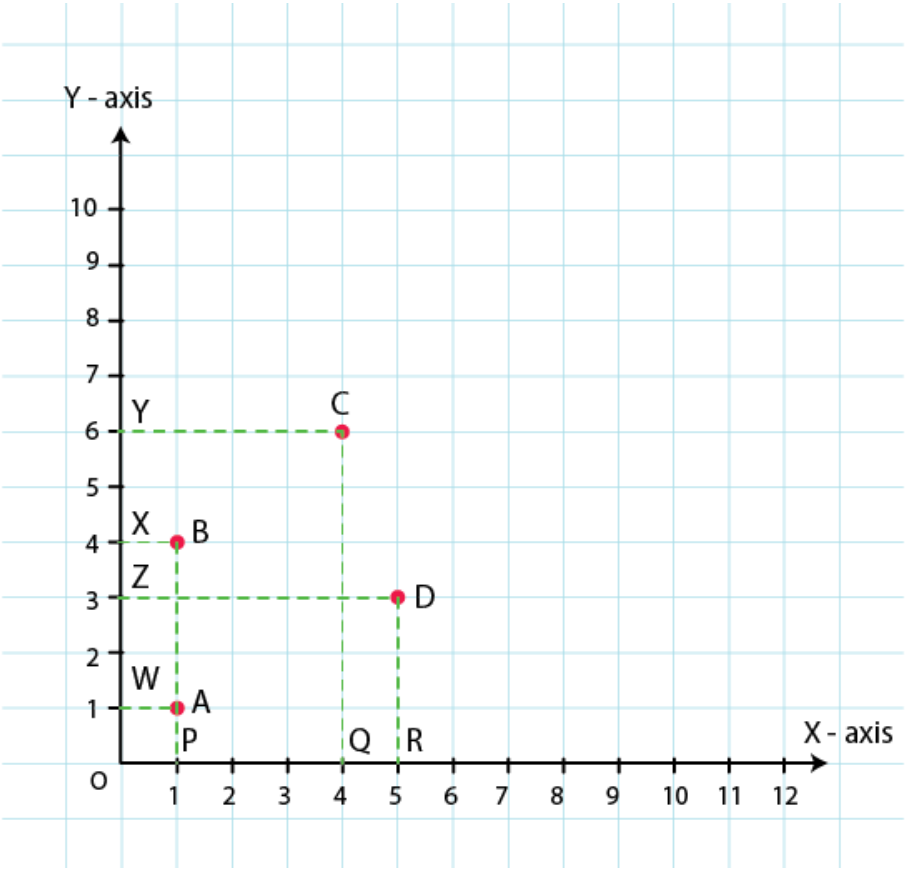


Draw perpendiculars AP, BP, CQ and DR from A, B, C and D on the x-axis. Also, draw perpendiculars AW, BX, CY and DZ on the y-axis.

From the above 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 C are (4, 6).

DZ = 5 units and DR= 3 units

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

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

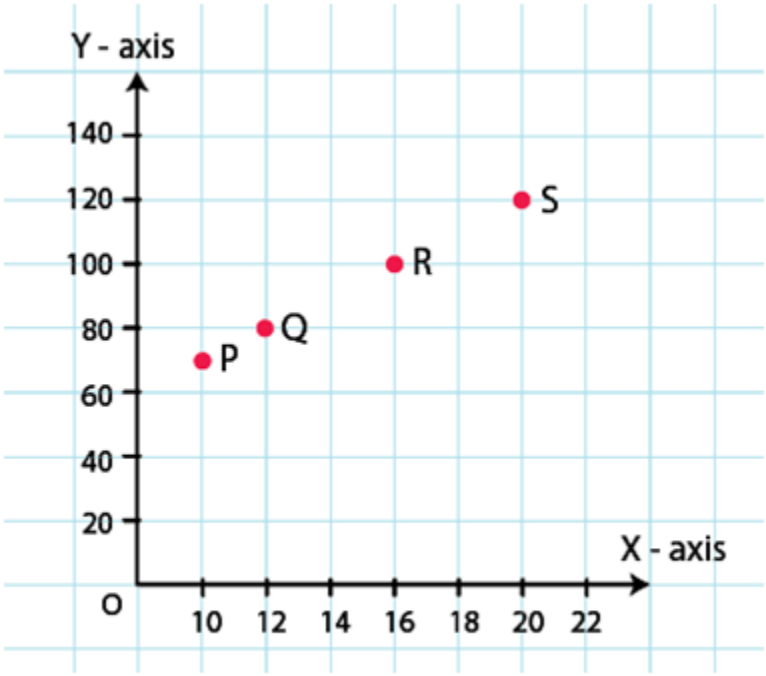
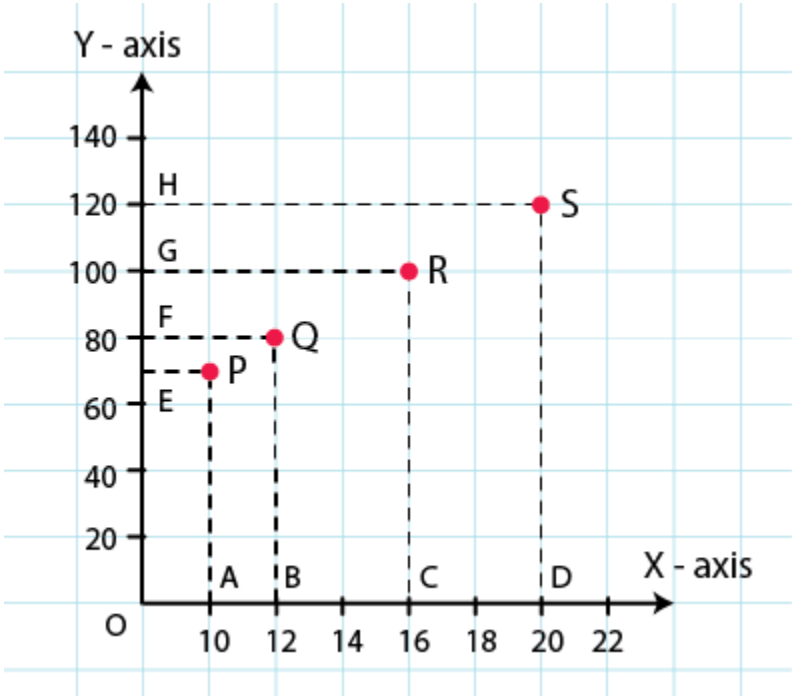


Fig. 27.8

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

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

QF = 12 units and QB = 80 units

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

RG = 16 units and RC = 100 units

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

SH = 20 units and SD = 120 units

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

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

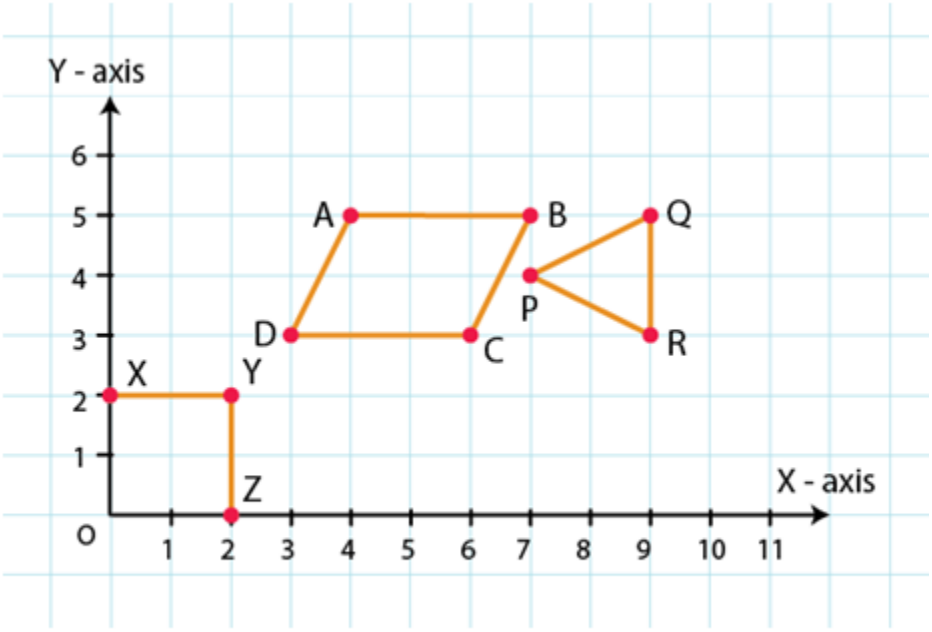
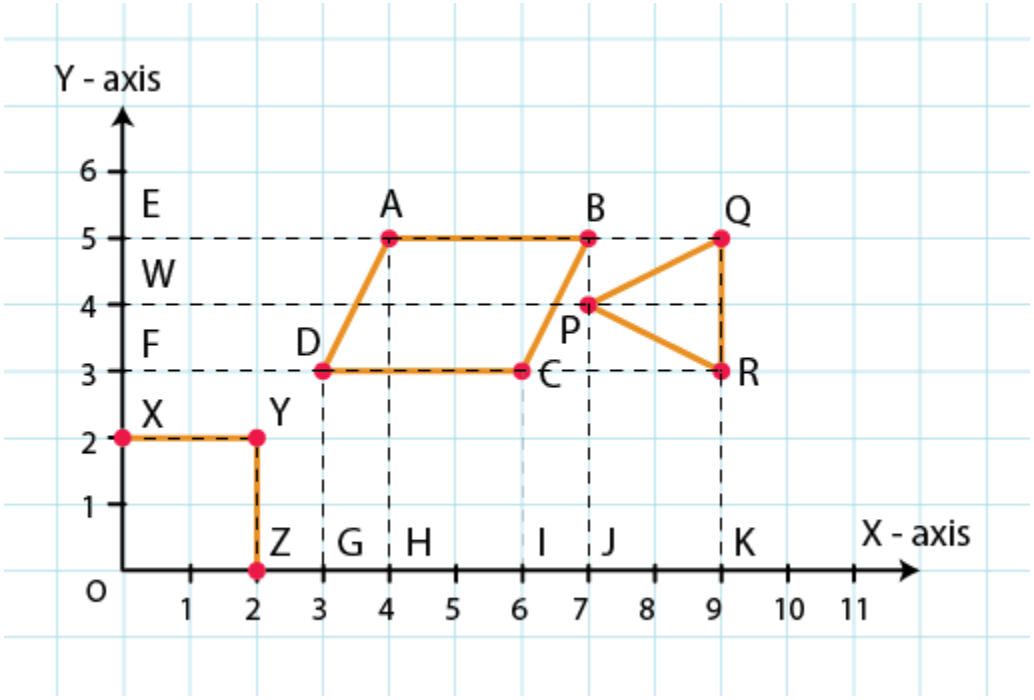


Fig. 27.9

Solution:



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From the figure, we have:

In Quadrilateral 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

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

AE = 4 units and AH = 5 units

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

CF = 6 units and CI = 3 units

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

BE = 7 units and BJ = 5 units

So, 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

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

QE = 9 units and QK = 5 units

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

RF = 9 units and RK = 3 units

So, the coordinates of R are (9, 3)

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.

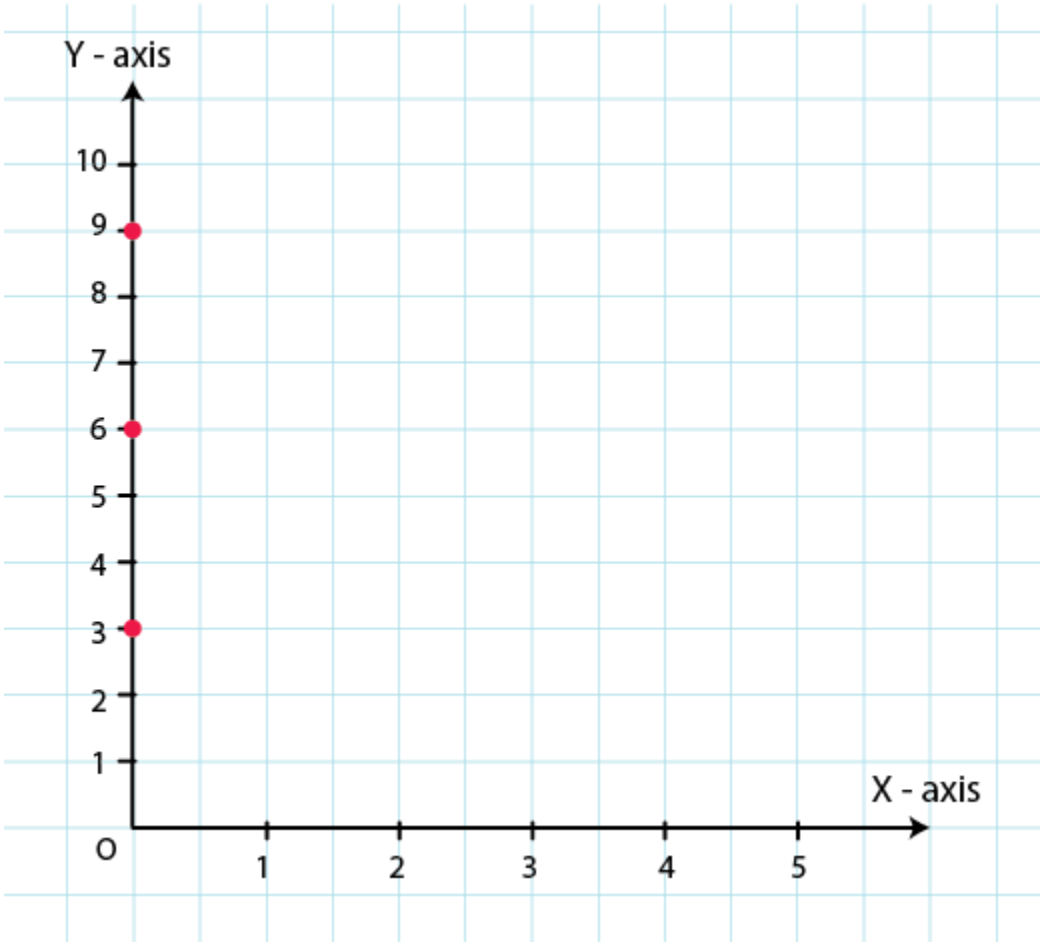
(ii) A point whose y-coordinate is zero, will lie on x-axis.

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



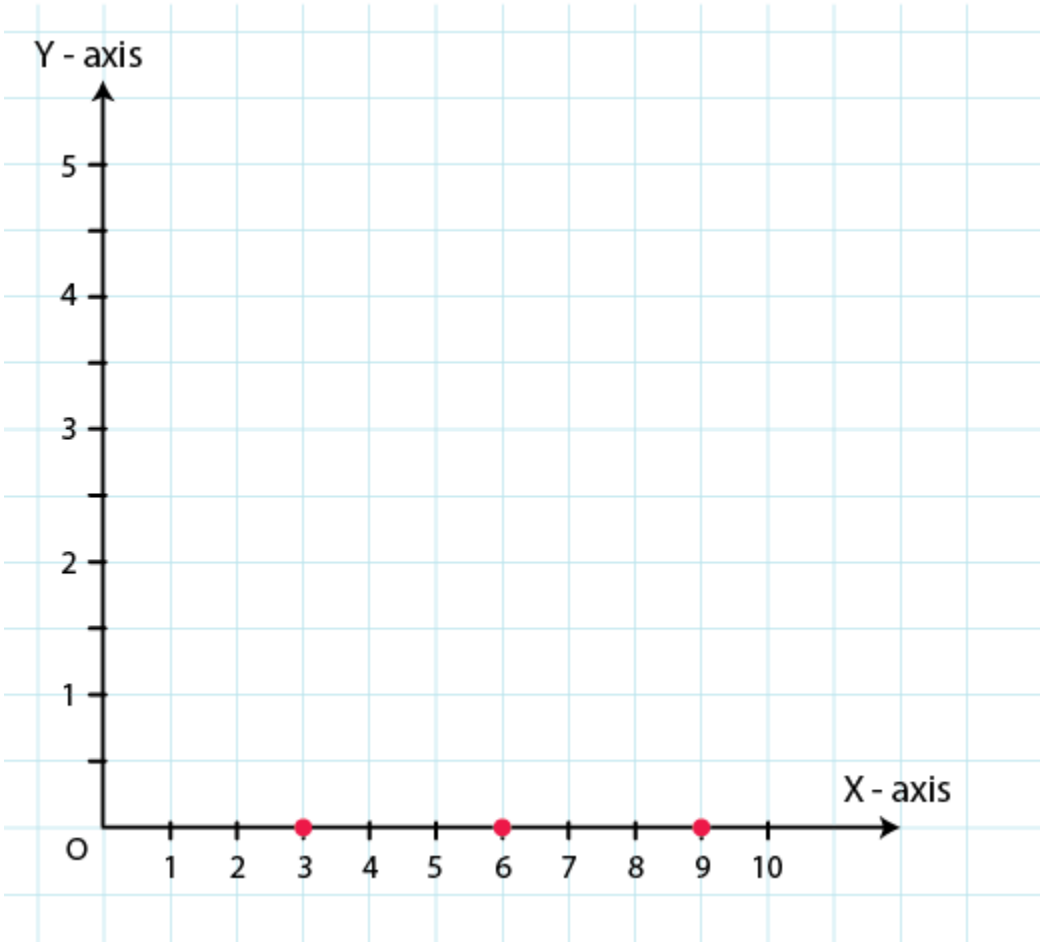
From the figure,

For x = 0, we have x- coordinates as zero.

For example (0, 3), (0, 6), (0, 9)

These points will lie on y axis. Hence, we say that our given statement is true.

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



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

For y = 0, we have y- coordinates as zero.

For example (3, 0), (6, 0), (9, 0)

These points will lie on x axis. Hence, we say that our given statement is true.

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

Origin is intersection of x-axis and y-axis. This means that coordinates of the origin will be intersection of lines y = 0 and x = 0.

Hence, coordinates of origin are (0, 0).

∴ Given statement is true.

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(iv) Points whose x and y coordinates (0, 0), (1, 1), (2, 2) etc are equal, lie on a line passing through the origin.

For above statement we can conclude that our statement satisfies the equation x = y.

For x = 0 and y = 0, this equation gets satisfied.

∴ Given statement is true.

EXERCISE 27.2 PAGE NO: 27.15

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 the information by a graph.

Solution:

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

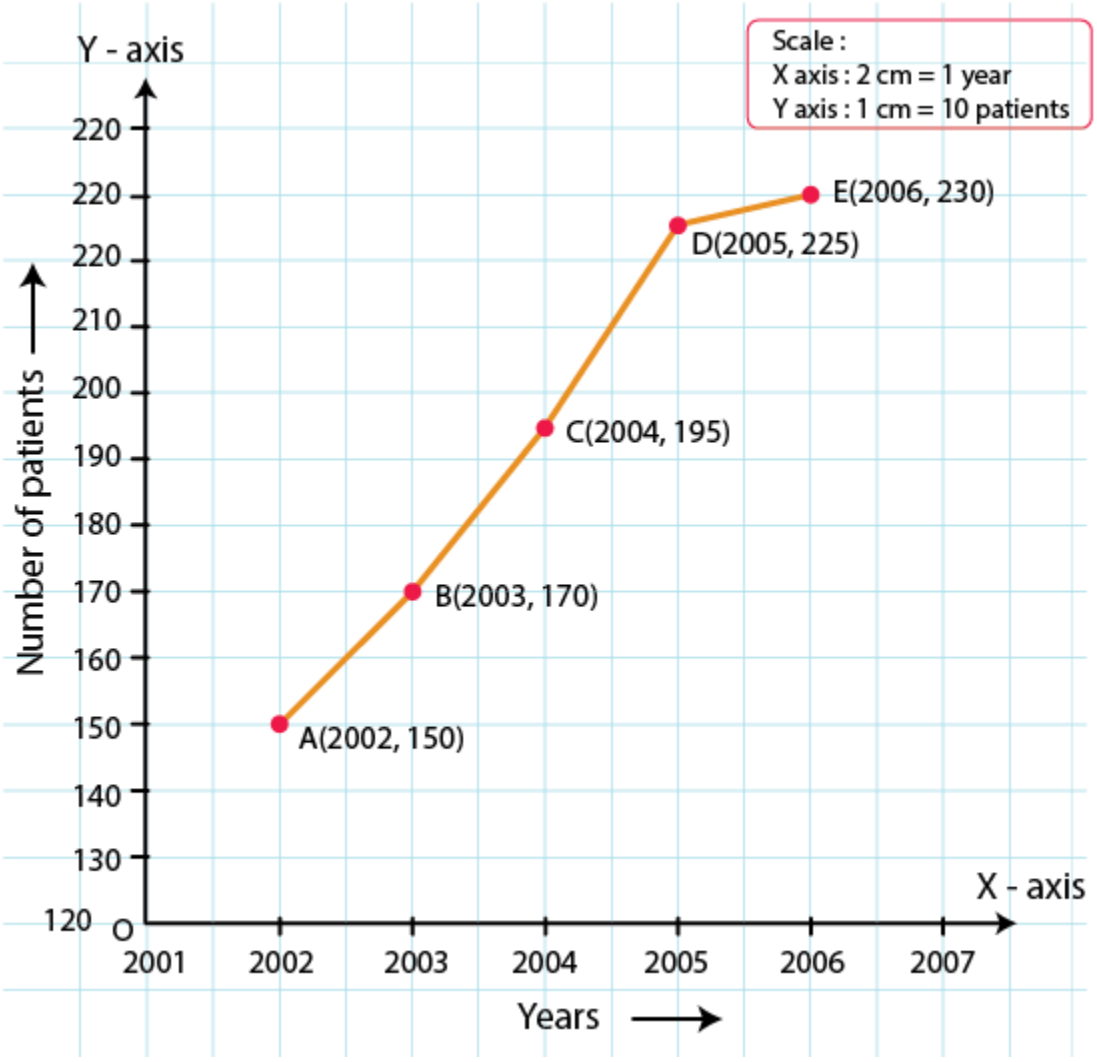
Let us choose the following scale:

On x-axis: 2 cm = 1 year

On y-axis: 1 cm = 10 patients

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.



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:

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We know that, the year is an independent variable and quantity of rice grown is a dependent variable. So let us take years on the x-axis and quantity of rice grown on the y-axis.

By choosing the following scale:

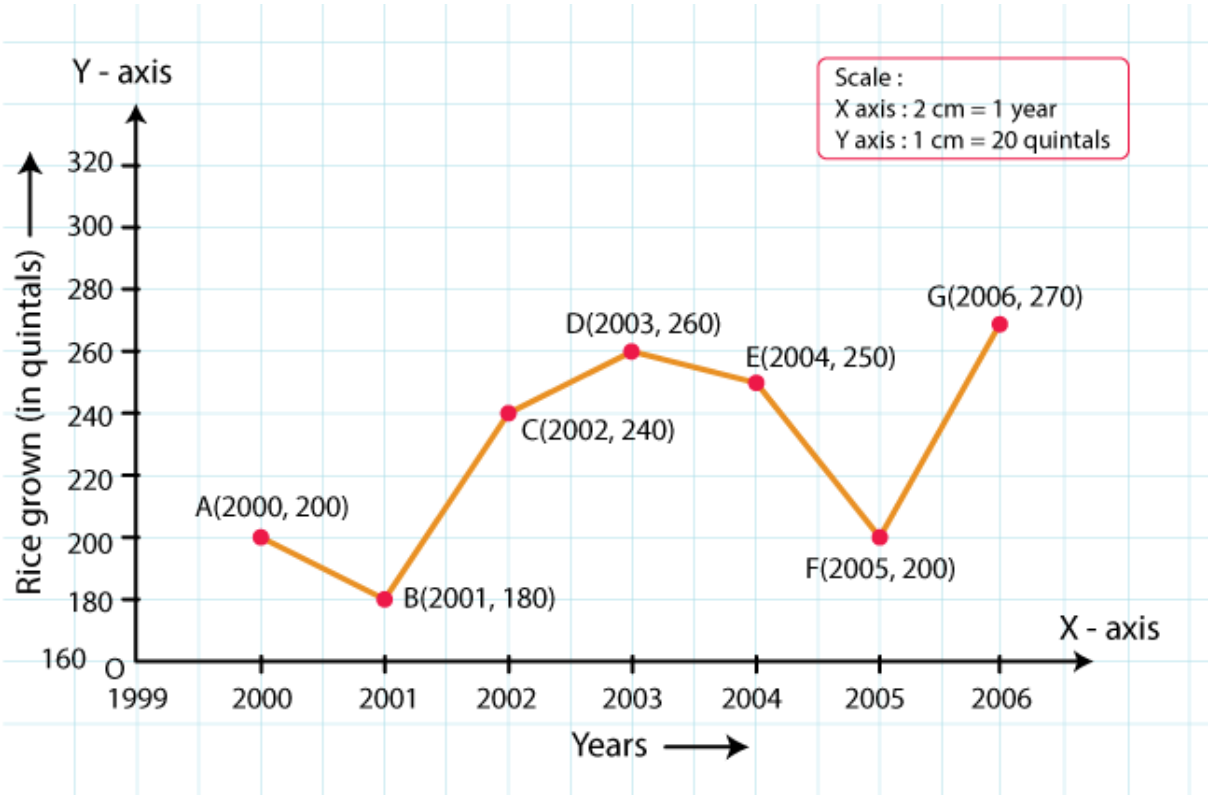
On x-axis: 2 cm = 1 year

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.



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 the graph of this information.

Solution:

We know, 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.

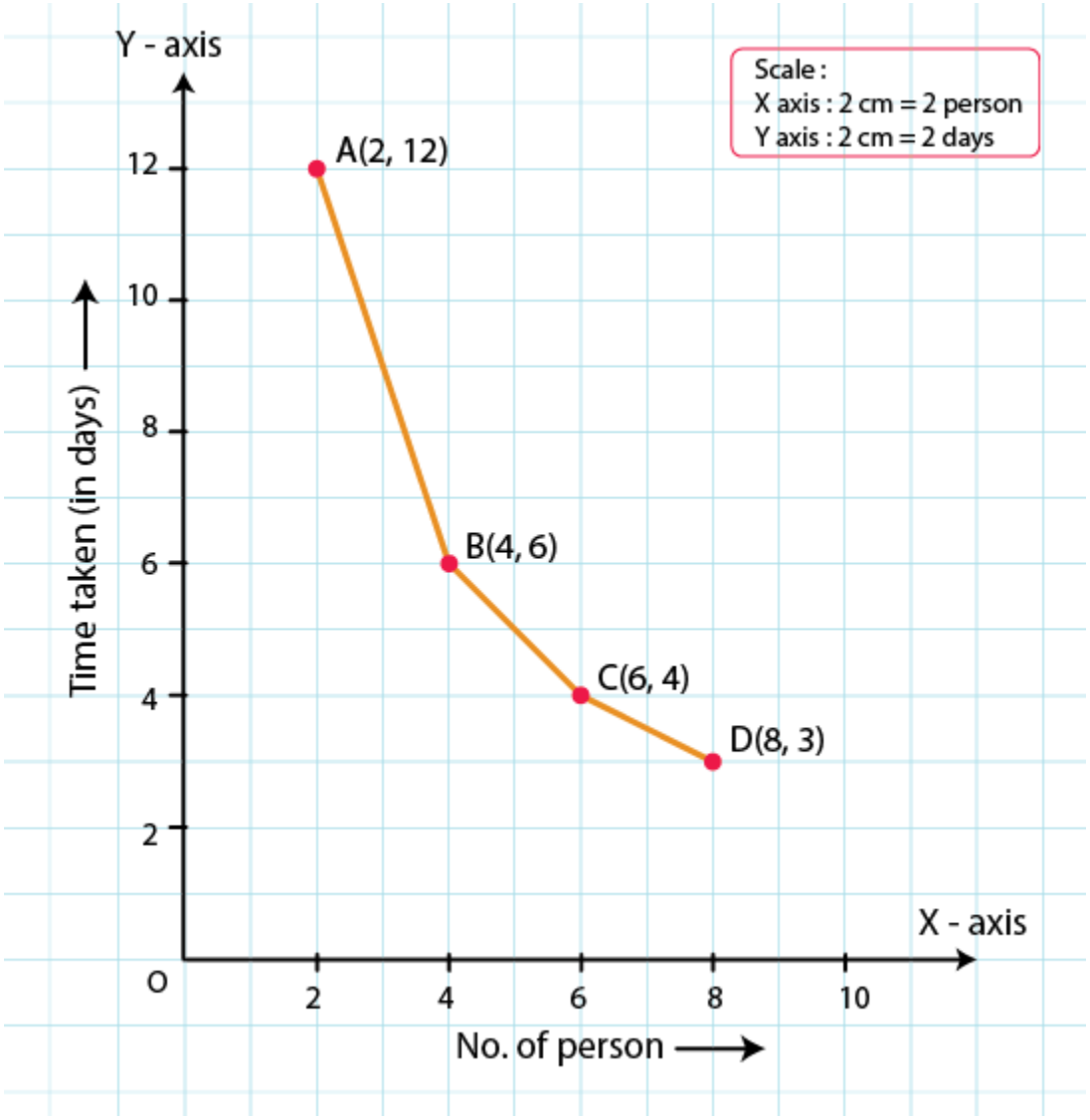
By choosing the following scale:

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.



4. The following table gives the information regarding 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**

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Draw a graph to illustrate this information.

Solution:

We know, length of a side is an independent variable and area of the square is a dependent variable.

So, let us take the length of a side on the x-axis and area of the square on the y-axis.

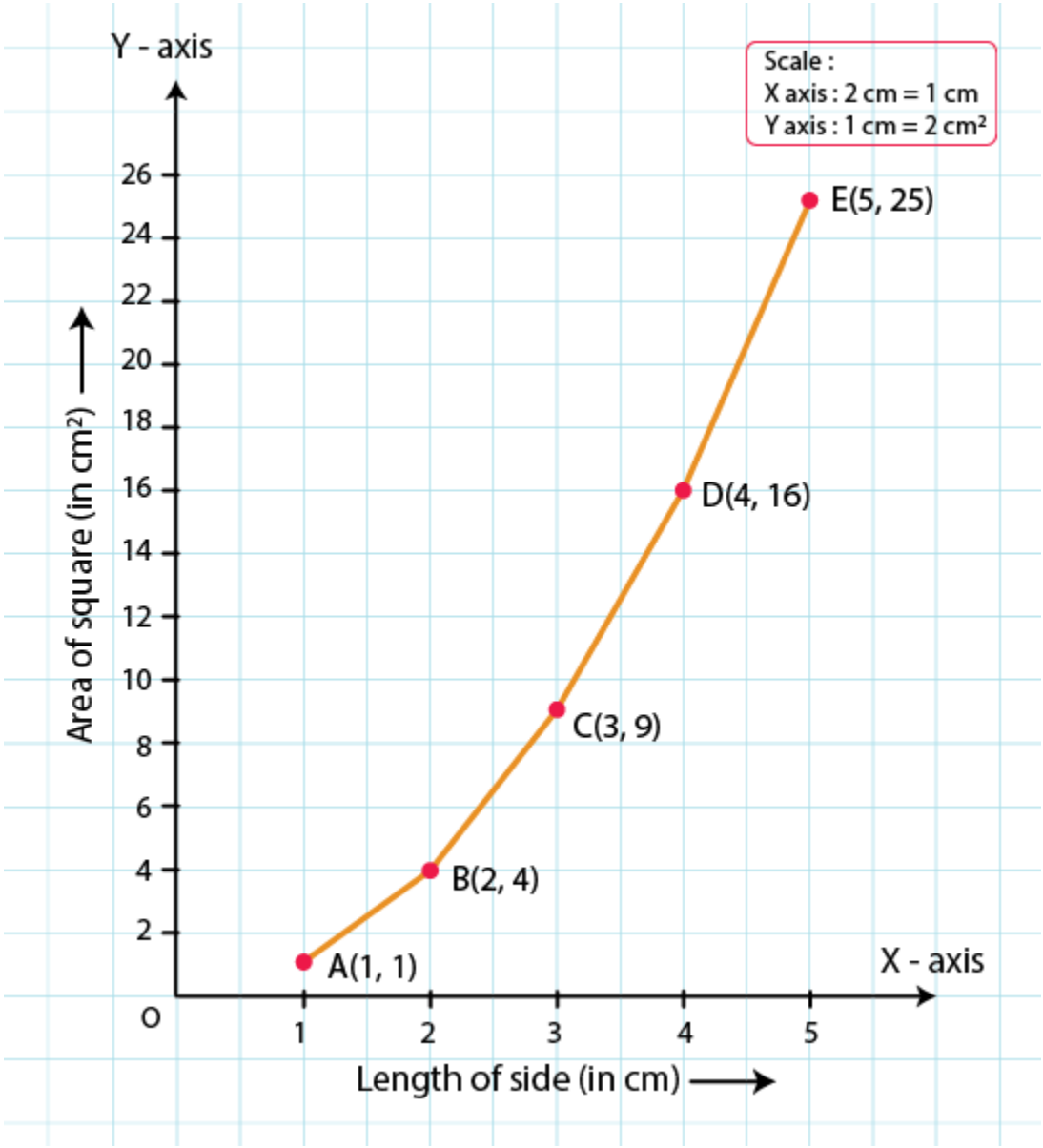
By choosing the following scale:

On x-axis: 2 cm = 1 cm

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

Now, let us 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.



5. The following table shows the sales of a commodity during the 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

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Draw a graph of this information.

Solution:

We know, 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.

By choosing the following scale:

On x-axis: 2 cm = 1 year

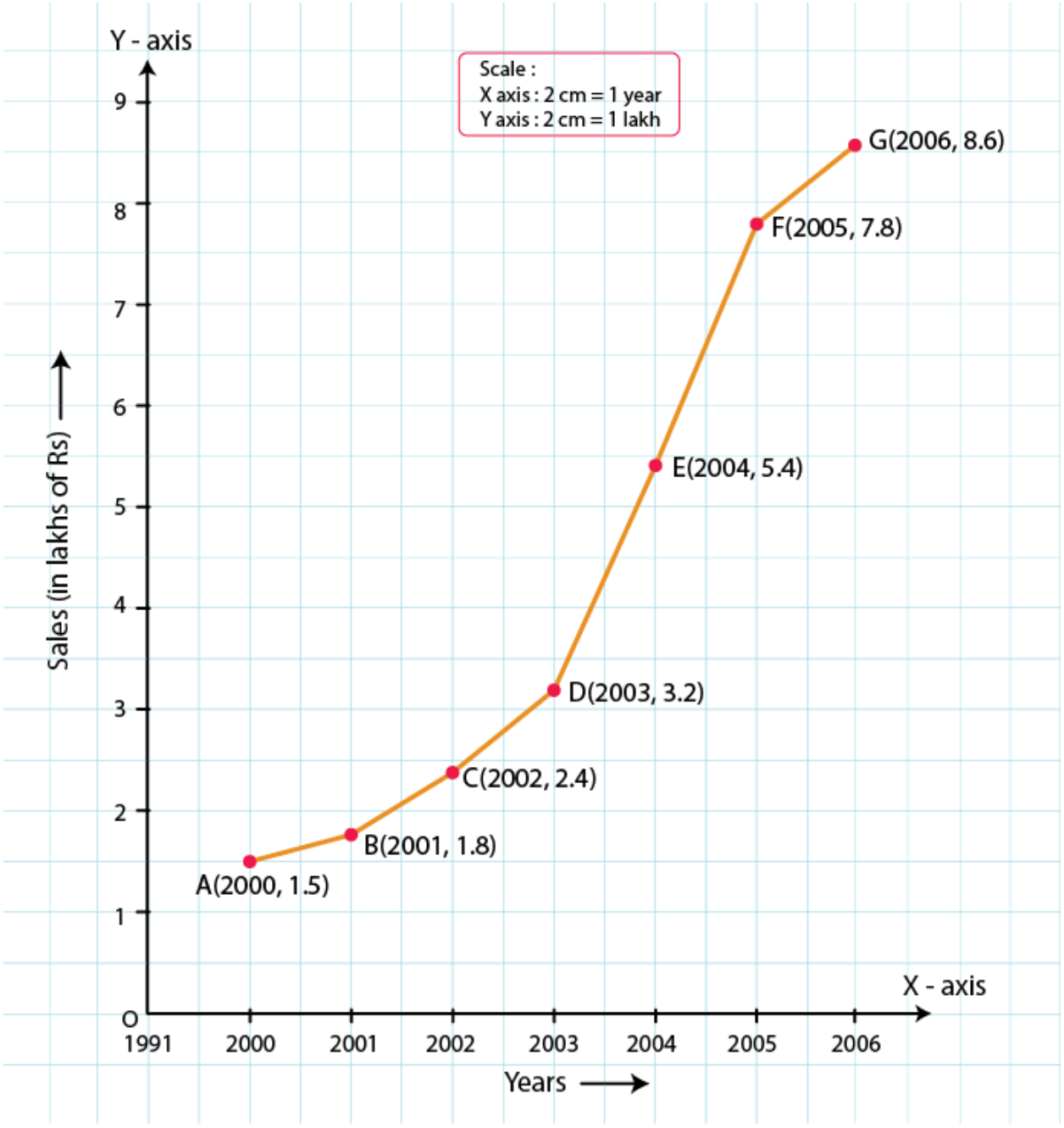
On y-axis: 2 cm = 1 lakh rupees

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.



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 (in °F)	**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 (in °F)	**100**	**101**	**104**	**103**	**99**	**98**	**100**

Solution:

(i) We know that, 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:

On x-axis: 1 cm = 1 hour

On y-axis: 1 cm = 1°F

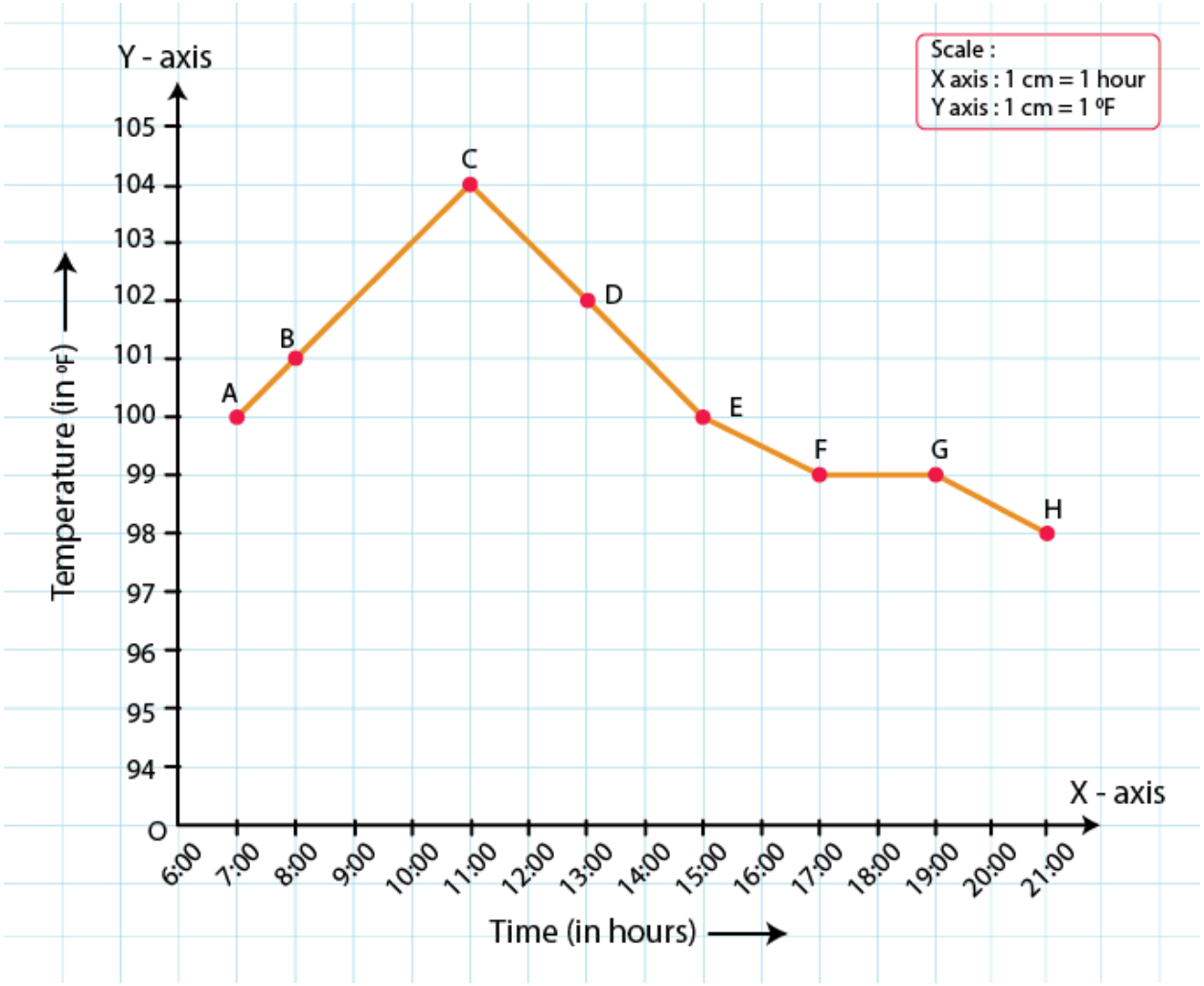
Let us assume that on the x-axis, the coordinate of origin is 6:00.

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)

These points are joined to get the graphs representing the given information as shown in the figures below.



(ii) We know that, 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:

On x-axis: 2 cm = 2 hours

On y-axis: 1 cm = 1°F

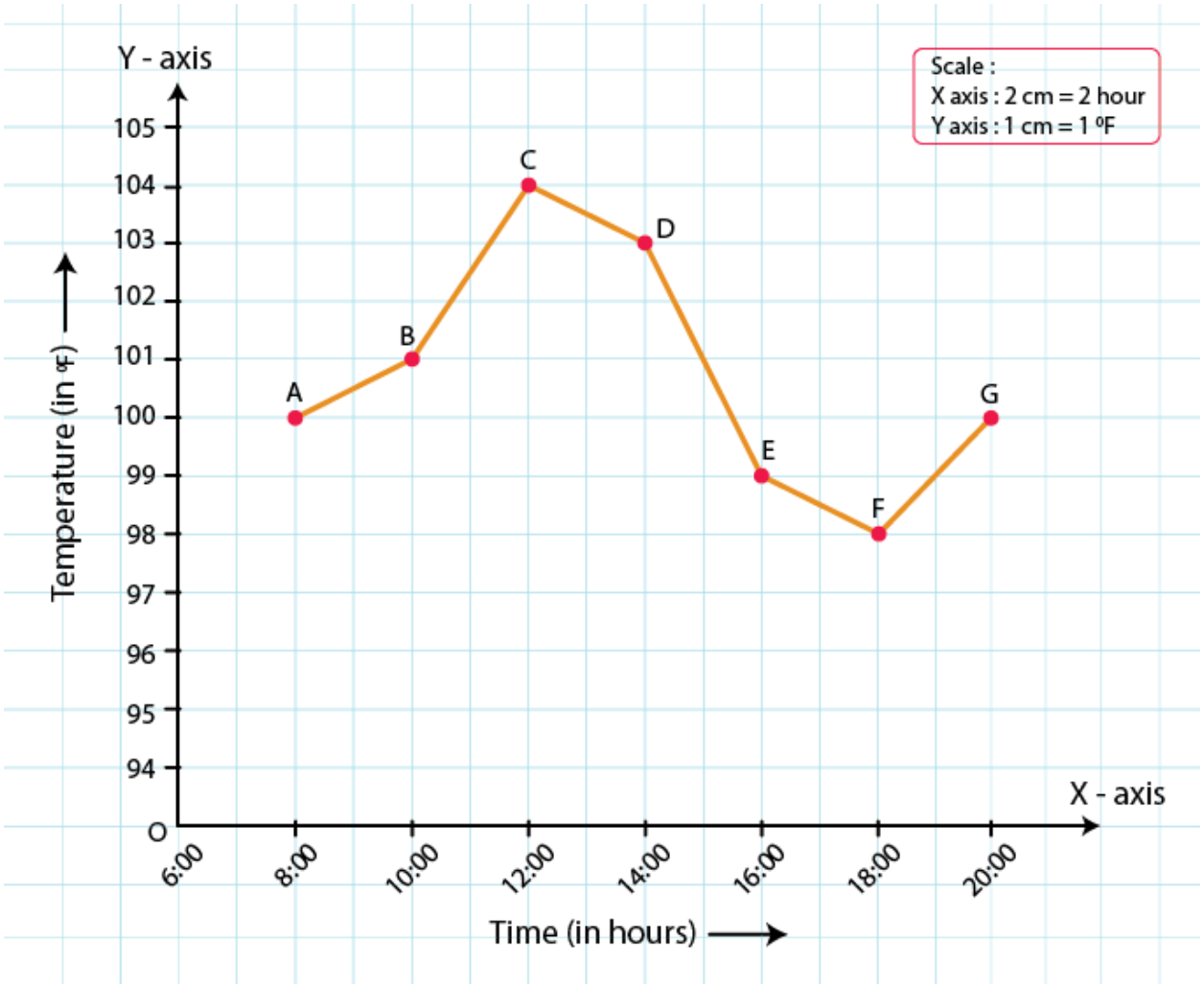
Let us assume that on the x-axis, the coordinate of origin is 6:00.

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

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

Now, let us plot (8:00, 100), (10:00, 101), (12:00, 104) ….. (20:00, 100).

These points are joined to get the graphs representing the given information as shown in the figures below.



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**

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Solution:

We know that, 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.

By choosing the following scale:

On x-axis: 2 big division = 1 hour

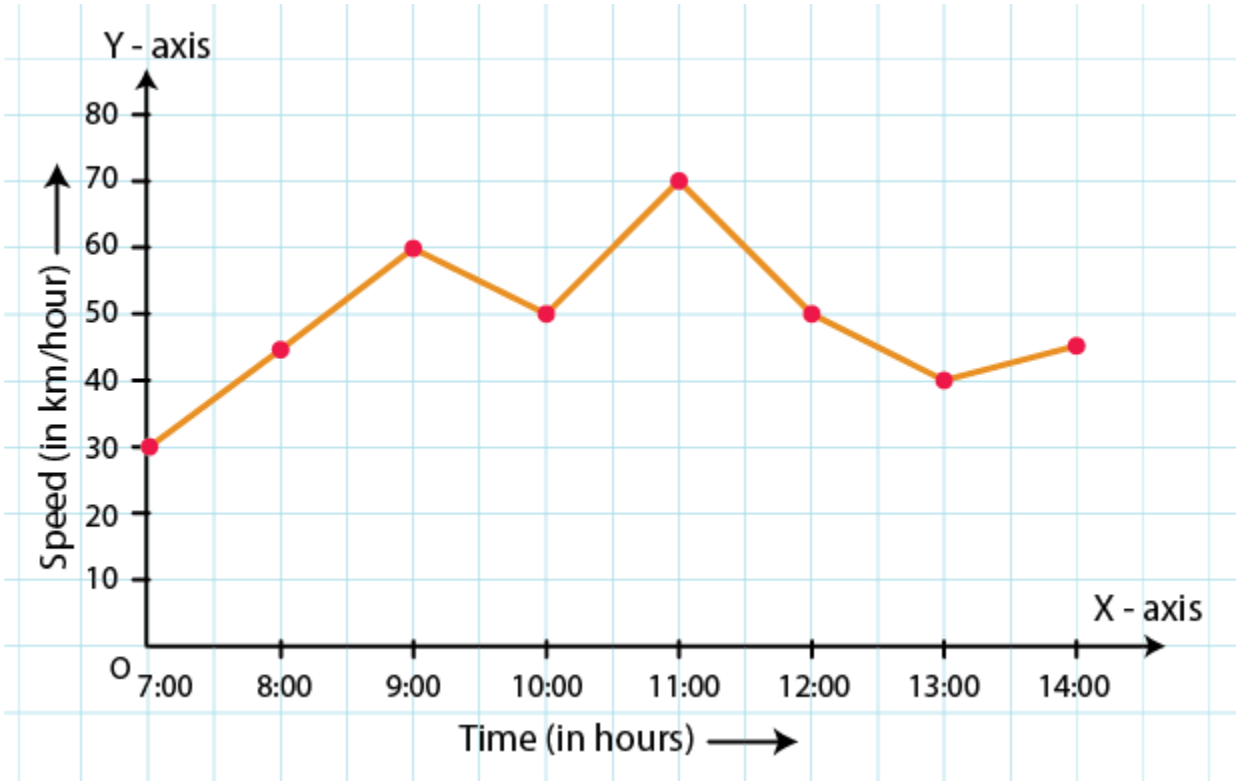
On y-axis: 1 big division = 10 km/hr

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.



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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 as a bar chart.

Solution:

We know that, over is an independent variable and run is a dependent variable. So, we take overs on the x-axis and runs on the y-axis.

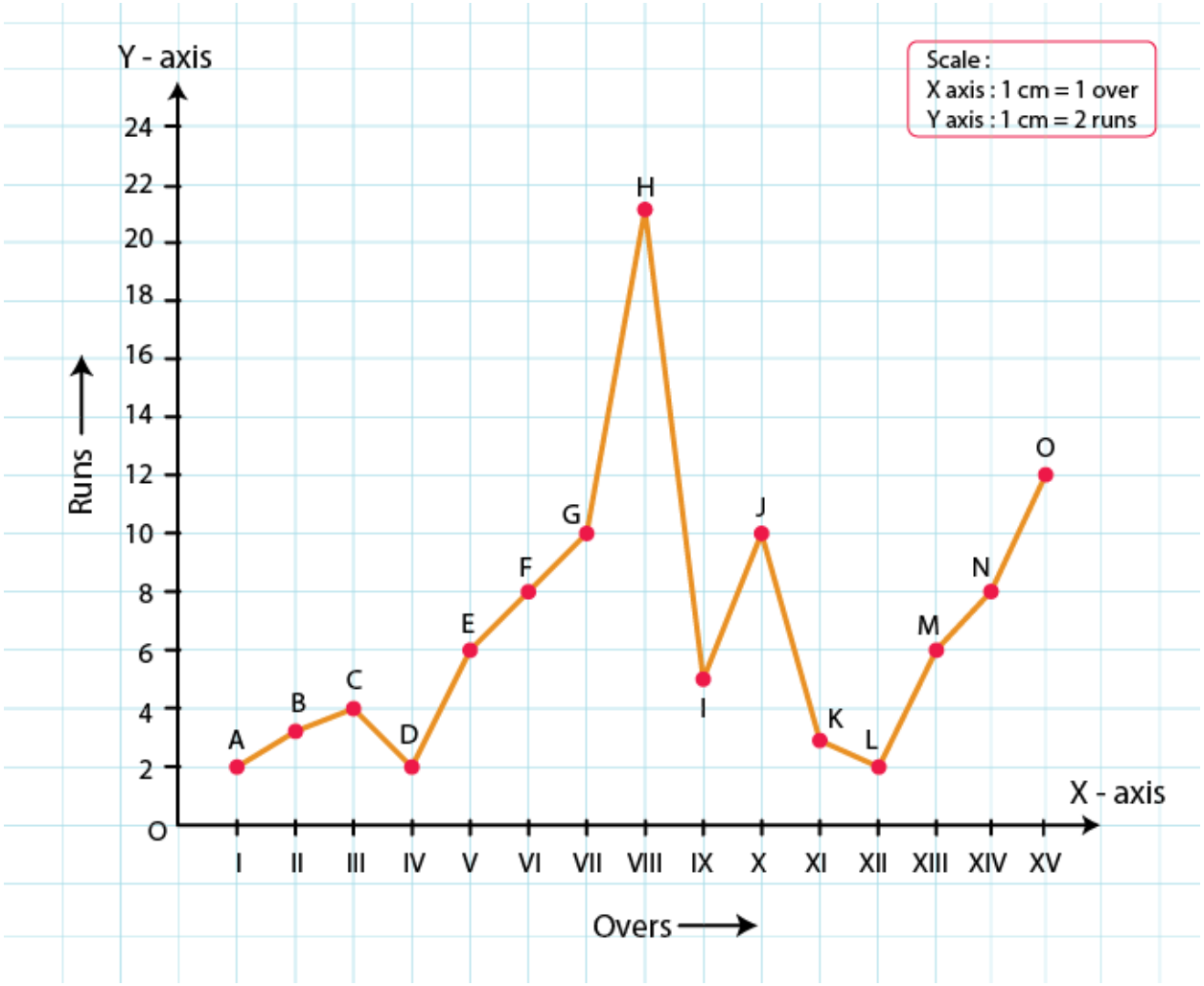
By choosing the following scale:

On x-axis: 1 cm = 1 over

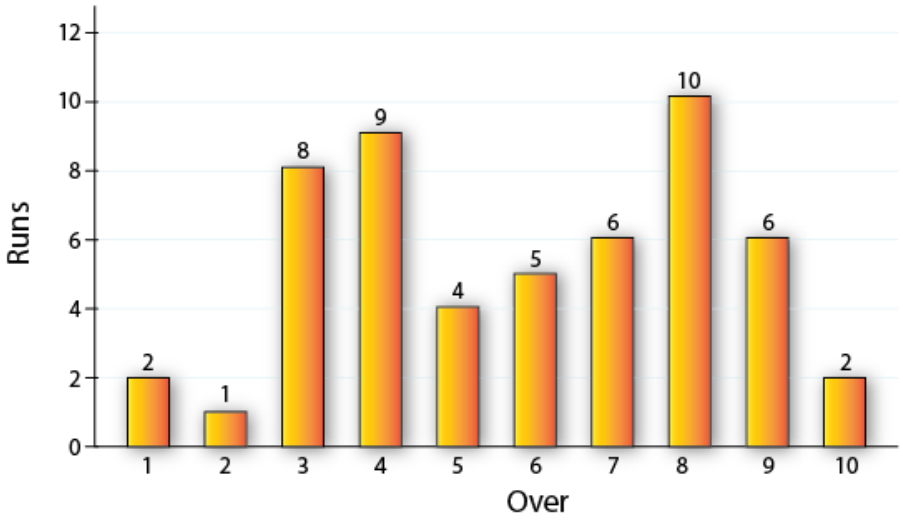
On y-axis: 1 cm = 2 runs

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.



The bar graph is as follows:



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:

We know that, over is an independent variable and run is a dependent variable. So, we take overs on x-axis and runs on the y-axis.

By choosing 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.

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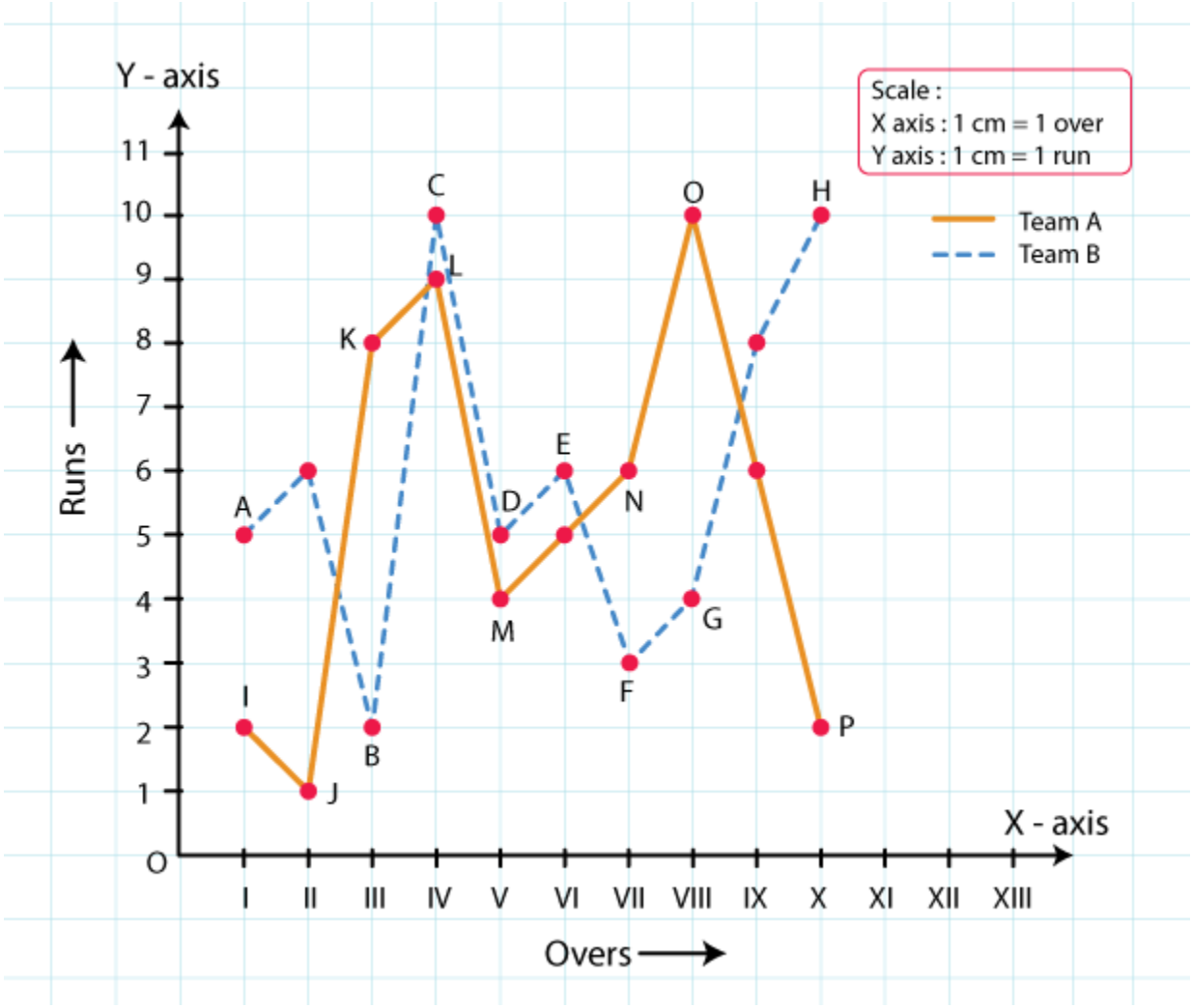
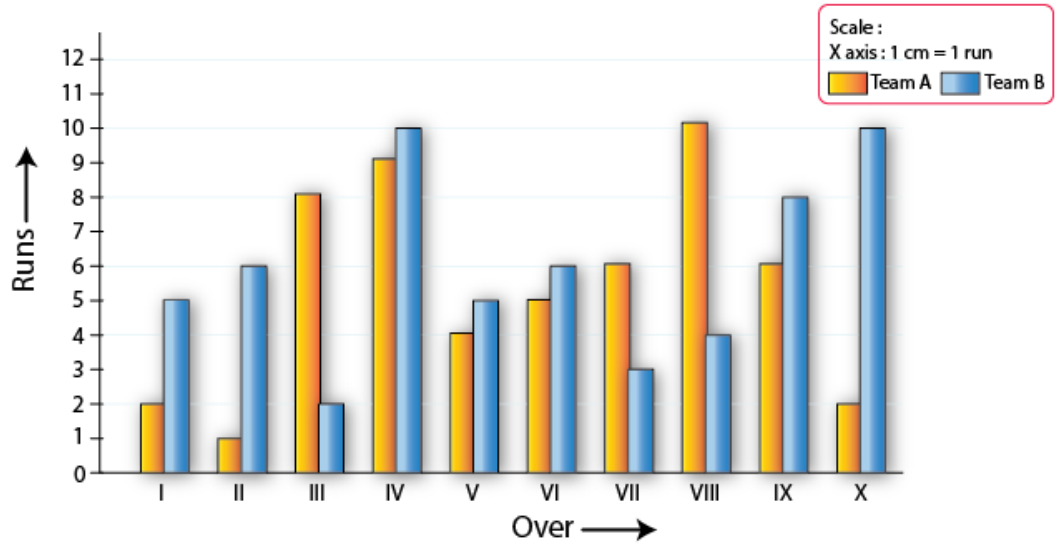
These points are joined to get the graph representing the given information as shown in the figure below.



The bar graph is as follows:



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Chapterwise RD Sharma Solutions for Class 8 Maths :

- Chapter 1–Rational Numbers
- Chapter 2–Powers
- Chapter 3–Squares and Square Roots
- Chapter 4–Cubes and Cube Roots
- Chapter 5–Playing with Numbers
- Chapter 6–Algebraic Expressions and Identities
- Chapter 7–Factorization
- Chapter 8–Division of Algebraic Expressions
- Chapter 9–Linear Equation in One Variable
- Chapter 10–Direct and Inverse Variations
- Chapter 11–Time and Work
- Chapter 12–Percentage
- Chapter 13–Profit, Loss, Discount and Value Added Tax (VAT)
- Chapter 14–Compound Interest
- Chapter 15–Understanding Shapes- I (Polygons)

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- Chapter 16–Understanding Shapes- II (Quadrilaterals)
- Chapter 17–Understanding Shapes- III (Special Types of Quadrilaterals)
- Chapter 18–Practical Geometry (Constructions)
- Chapter 19–Visualising Shapes
- Chapter 20–Mensuration - I (Area of a Trapezium and a Polygon)
- Chapter 21–Mensuration - II (Volumes and Surface Areas of a Cuboid and a cube)
- Chapter 22–Mensuration - III (Surface Area and Volume of a Right Circular Cylinder)
- Chapter 23–Data Handling - I (Classification and Tabulation of Data)
- Chapter 24–Data Handling - II (Graphical Representation of Data as Histogram)
- Chapter 25–Data Handling - III (Pictorial Representation of Data as Pie Charts or Circle Graphs)
- Chapter 26–Data Handling - IV (Probability)
- Chapter 27–Introduction to Graphs

About RD Sharma

RD Sharma i*sn't the kind of author you'd bump into at lit fests. But his bestselling books have helped many* CBSE *students lose their dread of* maths. *Sunday Times profiles the tutor turned internet star*

He dreams of algorithms that would give most people nightmares. And, spends every waking hour thinking of ways to explain concepts like 'series solution of linear differential equations'. Meet Dr Ravi Dutt Sharma — mathematics teacher and author of 25 reference books — whose name evokes as much awe as the subject he teaches. And though students have used his thick tomes for the last 31 years to ace the dreaded maths exam, it's only recently that a spoof video turned the tutor into a YouTube star.

R D Sharma had a good laugh but said he shared little with his on-screen persona except for the love for maths. "I like to spend all my time thinking and writing about maths problems. I find it relaxing," he says. When he is not writing books explaining mathematical concepts for classes 6 to 12 and engineering students, Sharma is busy dispensing his duty as vice-principal and head of department of science and humanities at Delhi government's Guru Nanak Dev Institute of Technology.