CHAPTER13

Introduction to Graphs

2MARK Q&A

Exercise 13.1

1. Plot the following points on a graph sheet. Verify if they lie on a line

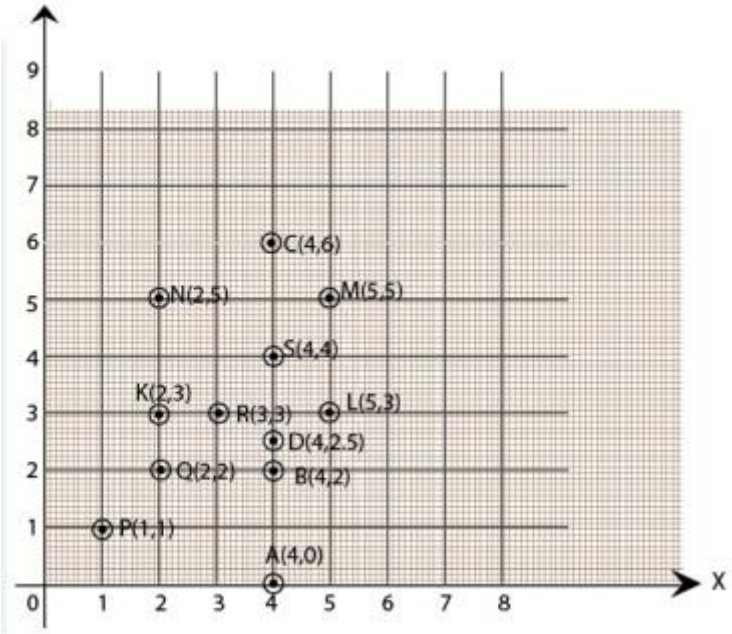
(a) A(4,0), B(4, 2),C(4,6), D(4, 2.5)

(b) P(1, 1), Q(2, 2), R(3,3), S(4, 4)

(c) K(2, 3), L(5, 3), M(5,5), N(2, 5)

Solution:

Plot all the points on the graph.



(a) All points, A, B, C and D, lie on a vertical line.

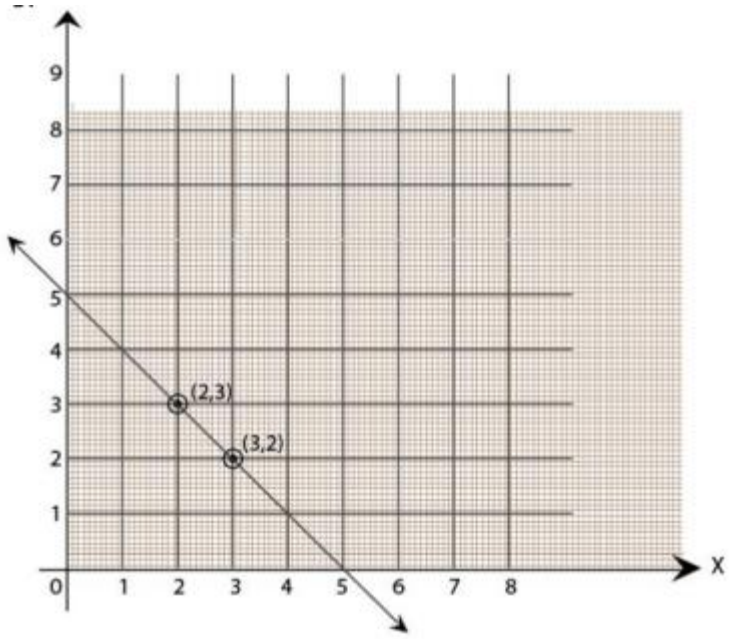
(b) P,Q, R and S points also make a line. It verifies that these points lie on a line.

(c) Points K, L, M and N. These points do not lie in a straight line.

2. Draw the line passing through (2,3)and(3,2). Find the coordinates of the points at which this line meets the x-axis and y-axis.

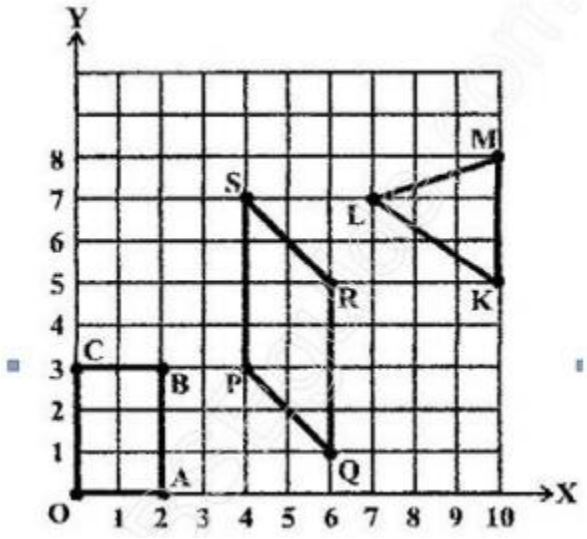
Solution:

Graph for the line passes through points (2, 3) and (3, 2) is



The coordinates of the points at which this line meets the x-axis at (5, 0) and Y axis at (0,5).

3. Write the coordinates of the vertices of each of these adjoining figures.



Solution:

We can observe three figures named as, OABC, PQRS and LMK.

Vertices of figure OABC

O (0, 0), A (2, 0), B (2, 3) and C (0, 3)

Vertices of figure PQRS

P (4, 3), Q (6, 1), R (6, 5) and S (4, 7)

Vertices of figure LMK

L (7, 7), M(10, 8) and K(10,5)

4. State whether True or False. Correct those that are False.

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

(ii) A point whose y-coordinate is zero and x-coordinate is 5 will lie on the y-axis.

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

Solution:

i) True.

ii) False; it will lie on the x-axis.

(iii) True.

Exercise 13.2

1. **Draw the graphs for the following tables of values, with suitable scales on the axes.**

(a) Cost of apples.

No. of apples	1	2	3	4	5
Cost (in Rs.)	5	10	15	20	25

(b) Distance travelled by car.

Time (in hours)	6 a.m.	7 a.m.	8 a.m.	9 a.m.
Distance (in km)	40	80	120	160

(i) How much distance did the car cover during the period 7.30 a.m. to 8 a.m.?

(ii) What was the time when the car had covered a distance of 100 km since its start?

(c) Interest on deposits for a year.

Deposit (in Rs.)	1000	2000	3000	4000	5000
Simple Interest (in Rs.)	80	160	240	320	400

(i) Does the graph pass through the origin?

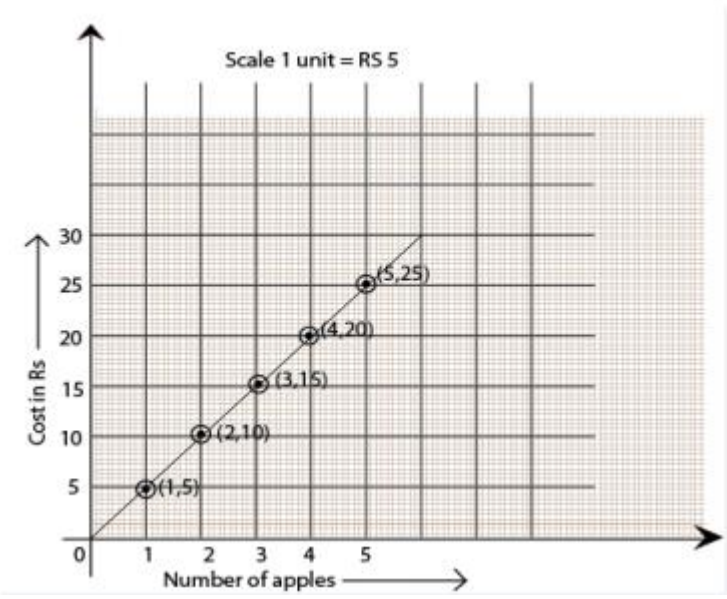
(ii) Use the graph to find the interest on Rs 2500 for a year.

(iii) To get an interest of Rs. 280 per year, how much money should be deposited?

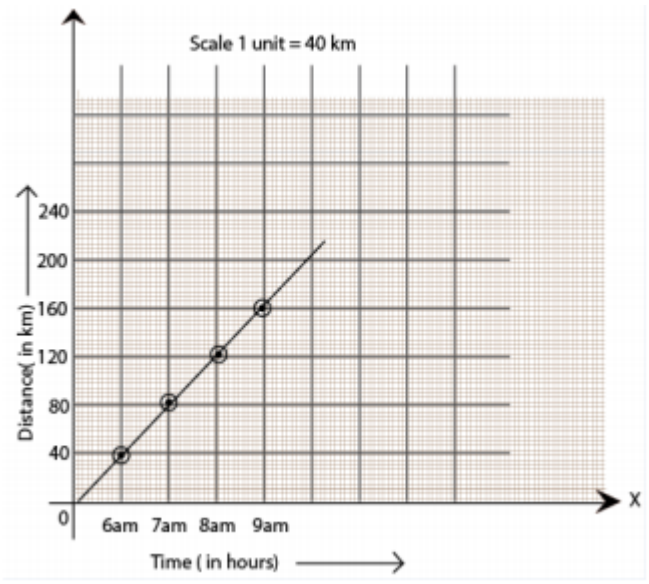
Solution:

Mark "number of apples" on the x-axis and "cost" on the y-axis. The graph is

(a)



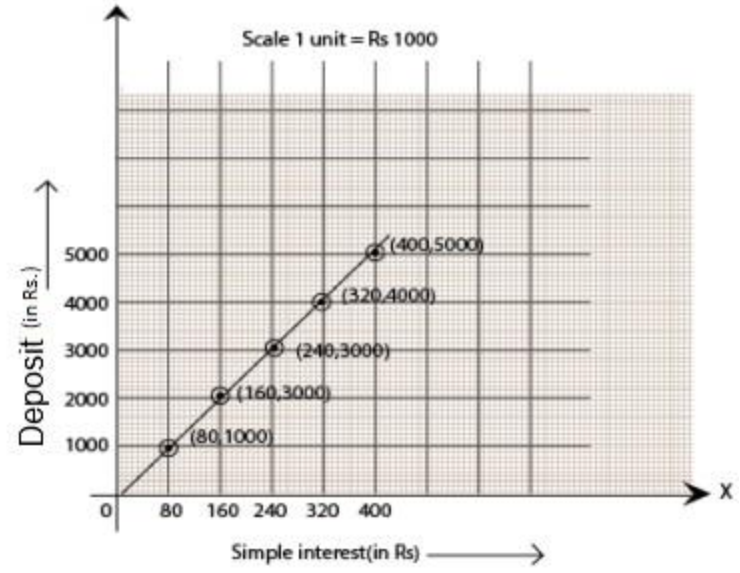
(b) Represent the "time" on the x-axis and "distance" on the y-axis.



(i) The car covered a distance of 20 km.

(ii) It was 7.30 am, when it covered a distance of 100 km.

(c) Represent "Deposit" on the y-axis and "simple interest" on the x-axis.



(i) Yes, the graph passes through the origin.

(ii) Interest on Rs. 2500 is Rs. 200 for a year.

(iii) Rs. 3500 should be deposited for the interest of Rs. 280.

2. Draw a graph for the following.

(i)

Side of square(in cm	2	3	3.5	5	6
Perimeter (in cm)	8	12	14	20	24

Is it linear graph?

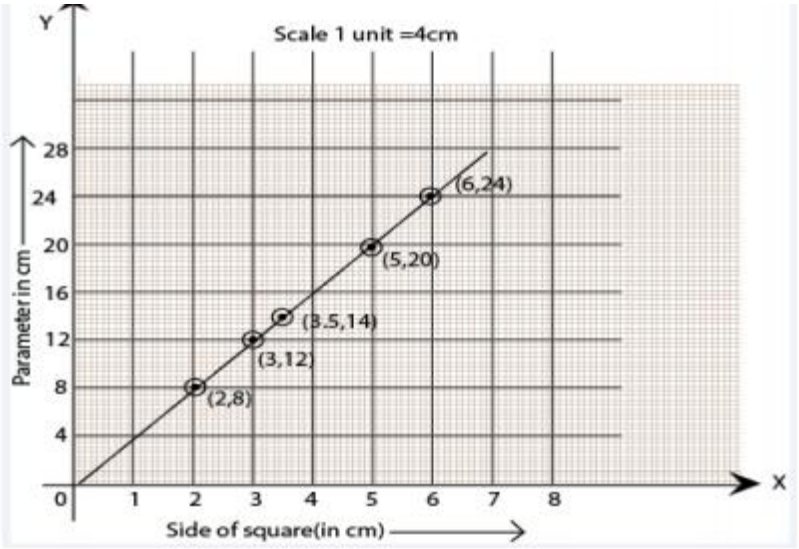
(ii)

Side of square (in cm	2	3	4	5	6
Area (in cm^2)	4	9	16	25	36

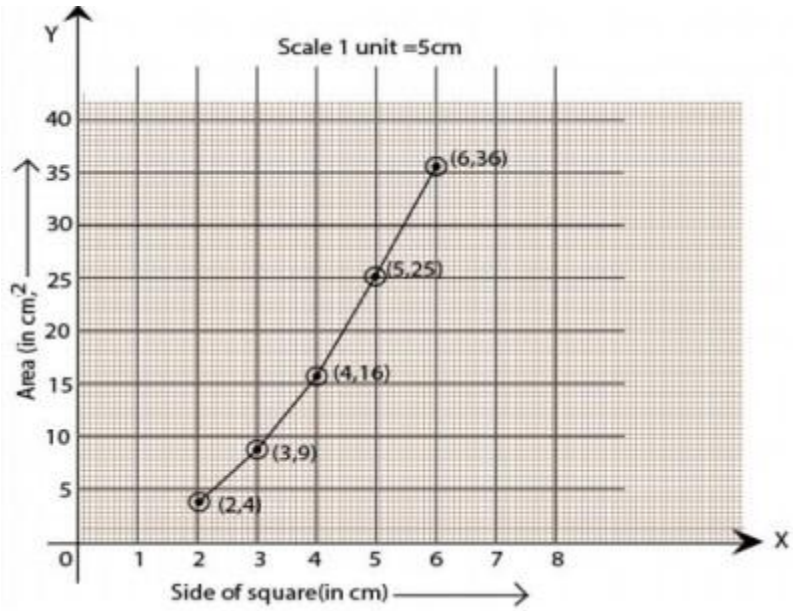
Is it a linear graph?

Solution:

(i) Yes, it is a linear graph.



(ii) No, it is not a linear graph because the graph does not provide a straight line.


Scale 1 unit =5cm
Y
X
Area (in cm)^2
Side of square(in cm)
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
(6,36)
(5,25)
(4,16)
(3,9)
(2,4)

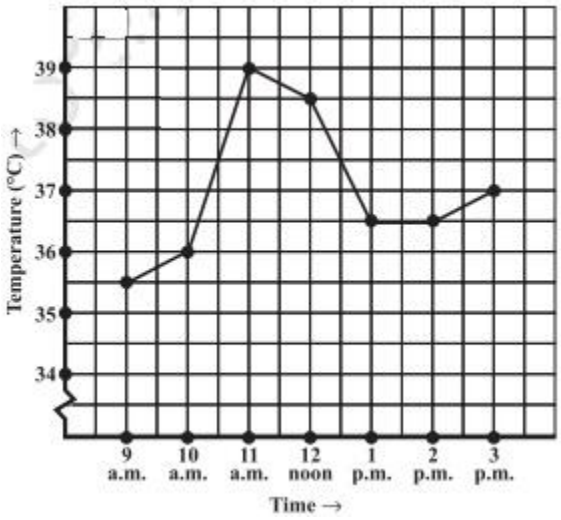
5MARK Q&A:

Exercise 13.3

1. The following graph shows the temperature of a patient in a hospital, recorded every hour.

(a) What was the patient's temperature at 1 p.m.?

(b) When was the patient's temperature 38.5° C?



(c) The patient's temperature was the same two times during the period given. What were these two times?

(d) What was the temperature at 1.30 p.m.? How did you arrive at your answer?

(e) During which periods did the patient's temperature show an upward trend?

Solution:

(a) The patient's temperature was 36.5^{o}C at 1 p.m.

(b) The patient's temperature was 38.5^{o}C at 12 noon.

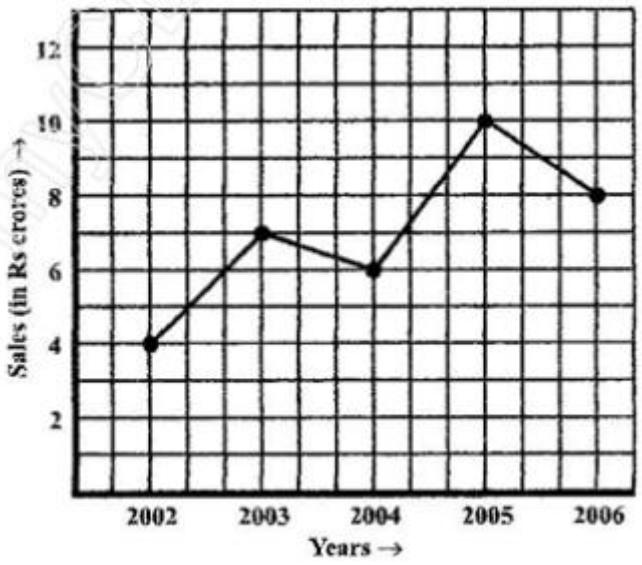
(c) The patient's temperature was same at 1 p.m. and 2p.m

(d) The temperature at 1.30 p.m. is 36.5^{o}C.

The point between 1p.m.and 2 p.m., the x-axis is equidistant from the two points showing 1 p.m. and 2 p.m. So, it represents 1.30 p.m. Similarly, the point on the y-axis, between 36^0 C and 37^0 C, represents 36.5^0 C.

(e) The patient's temperature showed an upward trend from 9 a.m. to 11 a.m. and from 2 p.m. to 3 p.m.

2. The following line graph shows the yearly sales figures for a manufacturing company.



(a) What were the sales in (i) 2002 (ii) 2006?

(b) What were the sales in (i) 2003 (ii) 2005?

(c) Compute the difference between the sales in 2002 and 2006.

(d) In which year was there the greatest difference between the sales as compared to the previous year?

Solution:

(a) The sales in

(i) 2002 was Rs. 4 crores and (ii) 2006 was Rs. 8 crores

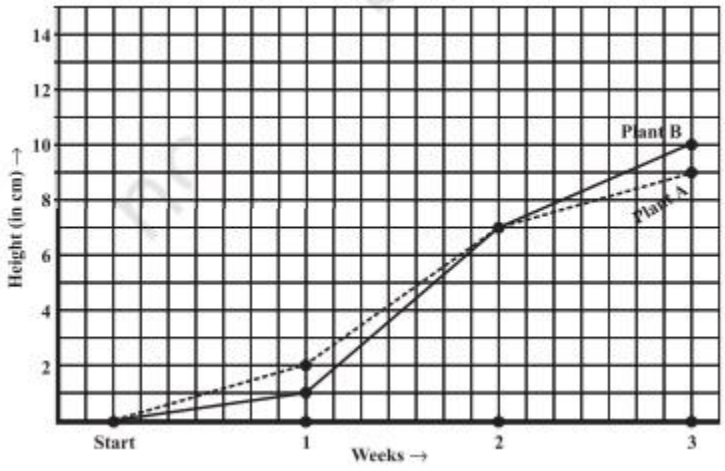
(b) The sales in

(i) 2003 was Rs. 7 crores and (ii) 2005 was Rs. 10 crores.

(c) The difference of sales in 2002 and 2006 = Rs. 8 crores–Rs. 4 crores= Rs. 4 crores

(d) In the year 2005, there was the greatest difference between the sales, and compared to its previous year, which is (Rs. 10 crores –Rs. 6 crores) = Rs. 4 crores

3. For an experiment in Botany, two different plants, plant A and plant B, was grown under similar laboratory conditions. Their heights were measured at the end of each week for 3 weeks. The results are shown by the following graph.



(a) How high was Plant A after (i) 2 weeks (ii) 3 weeks?

(b) How high was Plant B after (i) 2 weeks (ii) 3 weeks?

(c) How much did Plant A grow during the 3rd week?

(d) How much did Plant B grow from the end of the 2nd week to the end of the 3rd week?

(e) During which week did Plant A grow most?

(f) During which week did Plant B grow least?

(g) Were the two plants of the same height during any week shown here? Specify.

Solution:

(a)

(i) Plant A was 7 cm high after 2 weeks.

(ii) After 3 weeks, it was 9 cm high.

(b)

(i) Plant B was also 7 cm high after 2 weeks.

(ii) After 3 weeks, it was 10 cm high.

(c) Plant A grew=9 cm–7 cm = 2 cm during 3rd week

(d) Plant B grew from end of the 2nd week to the end of the 3rdweek = 10cm–7cm= 3cm

(e) Plant A grew the highest during the second week.

(f) Plant B grew the least during first week.

(g) Yes. At the end of the second week, plants A and B were of the same height, which is 7 cm.

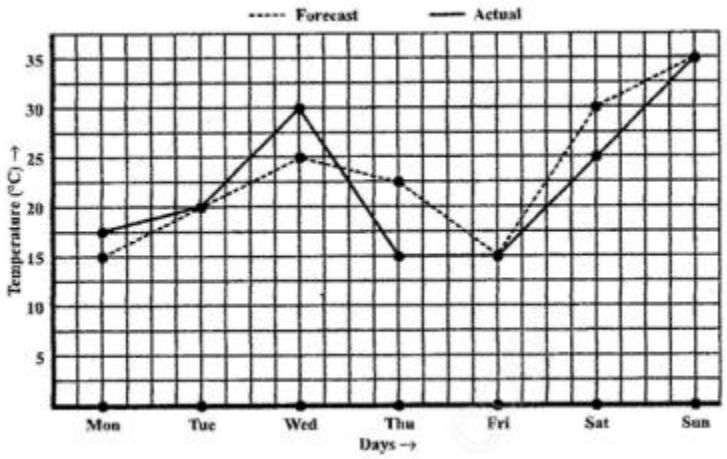
4. The following graph shows the temperature forecast and the actual temperature for each day of the week.

(a) On which days was the forecast temperature the same as the actual temperature?

(b) What was the maximum forecast temperature during the week?

(c) What was the minimum actual temperature during the week?

(d) On which day did the actual temperature differ the most from the forecast temperature?



Solution:

(a) On Tuesday, Friday and Sunday, the forecast temperature was same as the actual temperature.

(b) The maximum forecast temperature was 35^{o}C.

(c) The minimum actual temperature was 15^{o}C.

(d) The actual temperature differed the most from the forecast temperature on Thursday.

5. Use the tables below to draw linear graphs

(a) The number of days a hillside city received snow in different years.

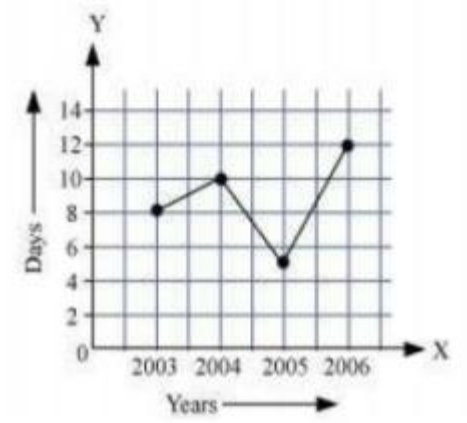
Year	2003	2004	2005	2006
Days	8	10	5	12

(b) Population (in thousands) of men and women in a village in different years.

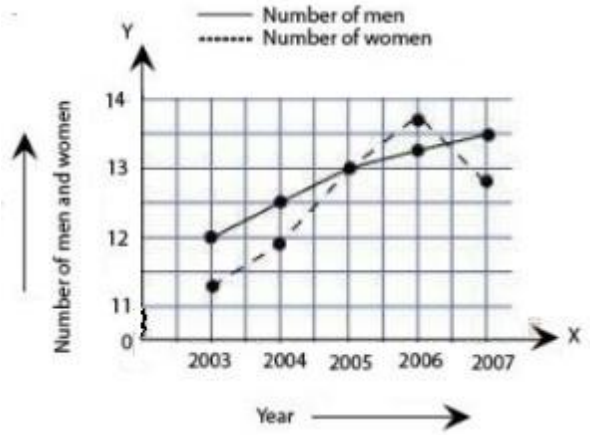
Year	2003	2004	2005	2006	2007
No. of Men	12	12.5	13	13.2	13.5
No. of Women	11.3	11.9	13	13.6	12.8

Solution:

(a) Consider "Years" along the x-axis and "Days" along the y-axis. Using the given information, the linear graph will look like this:



(b) Consider "Years" along the x-axis and "No. of Men and No. of Women" along the y-axis (2 graphs). Using the given information, the linear graph will look like this:



6. A courier person cycles from a town to a neighboring suburban area to deliver a parcel to a merchant. His distance from the town at different times is shown by the following graph.

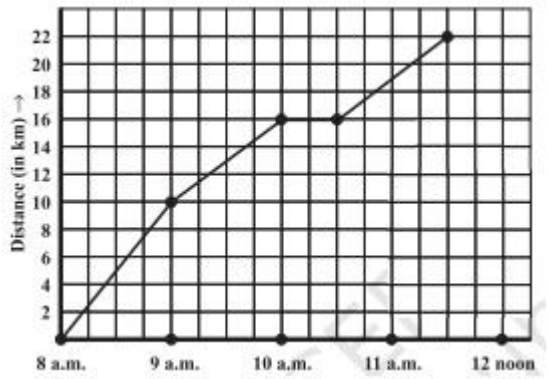
(a) What is the scale taken for the time axis?

(b) How much time did the person take for the travel?

(c) How far is the place of the merchant from the town?

(d) Did the person stop on his way? Explain.

(e) During which period did he ride fastest?



Solution:

(a) 4 units = 1 hour

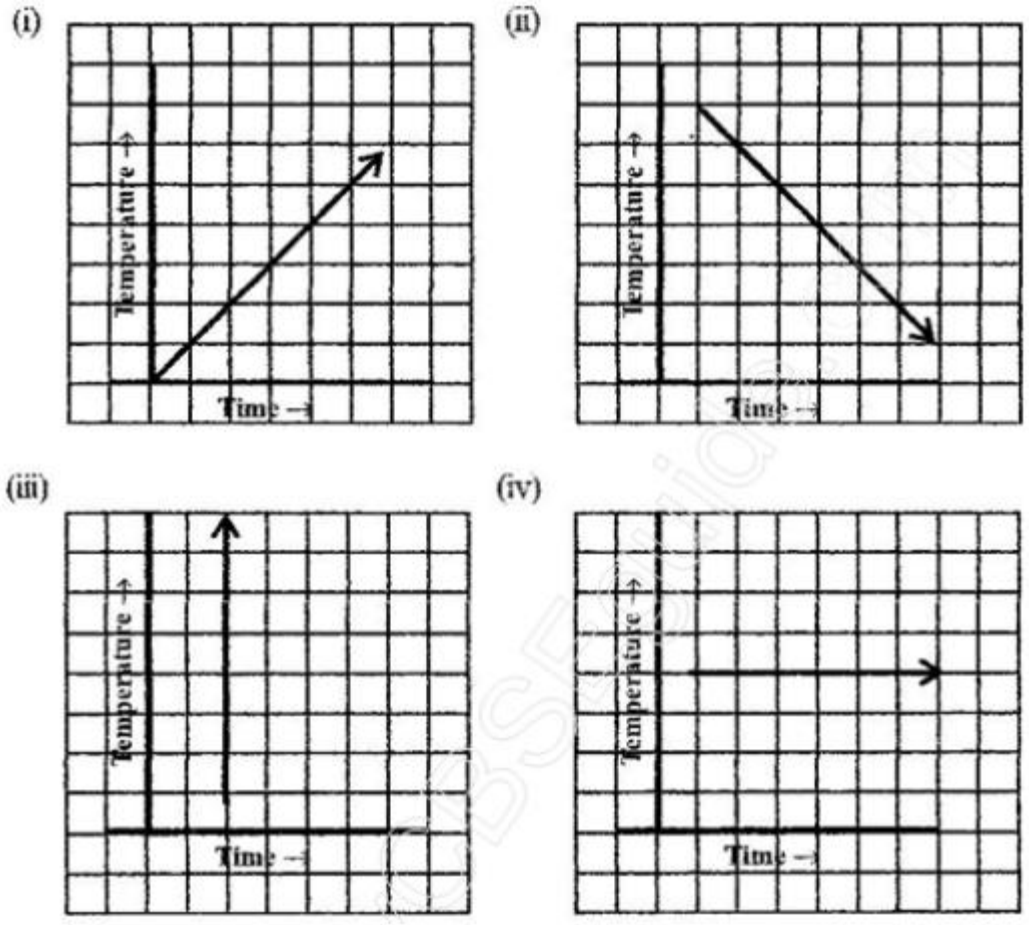
(b) The person took 3 ½ hours for the travel.

(c) It was 22 km far from the town.

(d) Yes, this has been indicated by the horizontal part of the graph. He stayed from 10 a.m. to 10.30 a.m.

(e) He rides the fastest between 8 a.m. and 9 a.m.

7. Can there be a time-temperature graph as follows? Justify your answer.



Solution:

(i) It is a time-temperature graph. It is showing the increase in temperature as time increases.

(ii) It is a time-temperature graph. It is showing the decrease in temperature as time increases.

(iii) The graph figure (iii) is not possible since the temperature is increasing very rapidly, which is not possible.

(iv) It is a time-temperature graph. It is showing constant temperature.

1MARK Q&A

Exercise 13.4

Multiple-choice questions and answers:

Question 1:

In a bar graph representing the number of books read by students in a class, what does the length of each bar typically represent?

a) Temperature

b) Frequency

c) Height

d) Speed

Answer 1:

b) Frequency

Question 2:

Which axis is typically used to represent the independent variable in a coordinate system?

a) x-axis

b) y-axis

c) z-axis

d) t-axis

Answer 2:

a) x-axis

Question 3:

If a line on a graph has a positive slope, what does this indicate about the relationship between the variables it represents?

a) No relationship

b) Negative relationship

c) Positive relationship

d) Undefined relationship

Answer 3:

c) Positive relationship

Question 4:

Which type of graph is most suitable for showing the distribution of scores in a class test?

a) Line graph

b) Bar graph

c) Pie chart

d) Scatter plot

Answer 4:

b) Bar graph

Question 5:

If the coordinates of a point on a graph are (0, -5), where is the point located?

a) 5 units to the right of the origin

b) 5 units to the left of the origin

c) 5 units above the origin

d) 5 units below the origin

Answer 5:

d) 5 units below the origin

Question 6:

What does the slope of a line on a graph represent?

a) Rate of change

b) Frequency

c) Magnitude

d) Area

Answer 6:

a) Rate of change

Question 7:

In a line graph representing the growth of a plant over time, what does the x-axis typically represent?

a) Temperature

b) Time

c) Height

d) Frequency

Answer 7:

b) Time

Question 8:

Which of the following is an example of qualitative data?

a) Temperature

b) Height

c) Color

d) Weight

Answer 8:

c) Color

Question 9:

If a line on a graph has a negative slope, what does this indicate about the relationship between the variables it represents?

a) No relationship

b) Negative relationship

c) Positive relationship

d) Undefined relationship

Answer 9:

b) Negative relationship

Question 10:

In a coordinate system, if a point is on the y-axis, what is the value of its x-coordinate?

a) 0

b) 1

c) -1

d) Undefined

Answer 10:

a) 0

Question 11:

Which type of graph is suitable for showing the percentage distribution of different categories in a whole?

a) Line graph

b) Bar graph

c) Pie chart

d) Scatter plot

Answer 11:

c) Pie chart

Question 12:

If the coordinates of a point on a graph are (-2, 0), where is the point located?

a) 2 units to the right of the origin

b) 2 units to the left of the origin

c) On the origin

d) 2 units above the origin

Answer 12:

b) 2 units to the left of the origin

Question 13:

What is the purpose of a legend in a graph?

a) It indicates the direction of the x-axis.

b) It explains the meaning of colors or symbols in the graph.

c) It shows the origin of the graph.

d) It represents the coordinates of points.

Answer 13:

b) It explains the meaning of colors or symbols in the graph.

Question 14:

If a point on a graph has coordinates (5, -3), what does the 5 represent?

a) The y-coordinate

b) The x-coordinate

c) The slope

d) The frequency

Answer 14:

b) The x-coordinate

Question 15:

In a scatter plot, what does each point represent?

a) Categories

b) Frequency

c) Individual data values

d) Average values

Answer 15:

b) Individual data values

Exercise 13.5:

Fill in the blanks:

a. In a graph, points are represented by _____ (x, y) values.

- Answer: Coordinates

b. To plot a point on a graph, locate the x-coordinate on the _____ axis and the y-coordinate on the _____ axis.

- Answer: x-axis, y-axis

c. Linear graphs follow an equation in the form y = _____.

- Answer: mx + c

d. Non-linear graphs do not form _____ lines.

- Answer: straight

e. The slope of a line is calculated as the change in y divided by the change in _____.

- Answer: x

f. The x-intercept is found by setting y = _____.

- Answer: 0

g. Understanding scales and interpreting trends are essential aspects of _____ graphs.

- Answer: reading

h. Real-life scenarios such as distance-time graphs and temperature changes are represented using _____.

- Answer: graphs

i. Graphs are used to visually represent data and understand relationships between different _____.

- Answer: variables

j. The point where the x-axis and y-axis intersect is called the _____.

- Answer: origin

Summary

1. Graphs: A graph is a visual representation of data that shows how two variables are related. It consists of two axes – the horizontal axis (x-axis) and the vertical axis (y-axis).

2. Coordinates: In a graph, points are plotted using coordinates (x, y). The x-coordinate represents the horizontal position on the graph, and the y-coordinate represents the vertical position. The point (0,0) is called the origin and is where the x-axis and y-axis intersect.

3. Plotting Points: To plot a point on a graph, locate the x-coordinate on the x-axis and the y-coordinate on the y-axis, and then mark the point where they intersect.

4. Types of Graphs:

- **Linear Graphs:** These are straight-line graphs where the relationship between x and y is constant. They can be represented by an equation in the form y = mx + c, where m is the slope and c is the y-intercept.

- **Non-linear Graphs:** These graphs don't form a straight line. They can take various shapes such as curves, parabolas, circles, etc.

5. Slope: The slope of a line describes its steepness. It is calculated as the change in y divided by the change in x. A higher slope means a steeper line.

6. Intercepts: The x-intercept is where the graph crosses the x-axis, and the y-intercept is where the graph crosses the y-axis. They can be found by setting x = 0 or y = 0, respectively, in the equation of the line.

7. Reading and Interpreting Graphs: Understanding how to read graphs is crucial. This includes identifying key points, interpreting trends, understanding scales, and making predictions based on the information presented.

8. Graphical Representation of Real-life Situations: Graphs are used to represent real-world scenarios such as distance-time graphs, velocity-time graphs, temperature changes over time, etc.

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THANKYOU