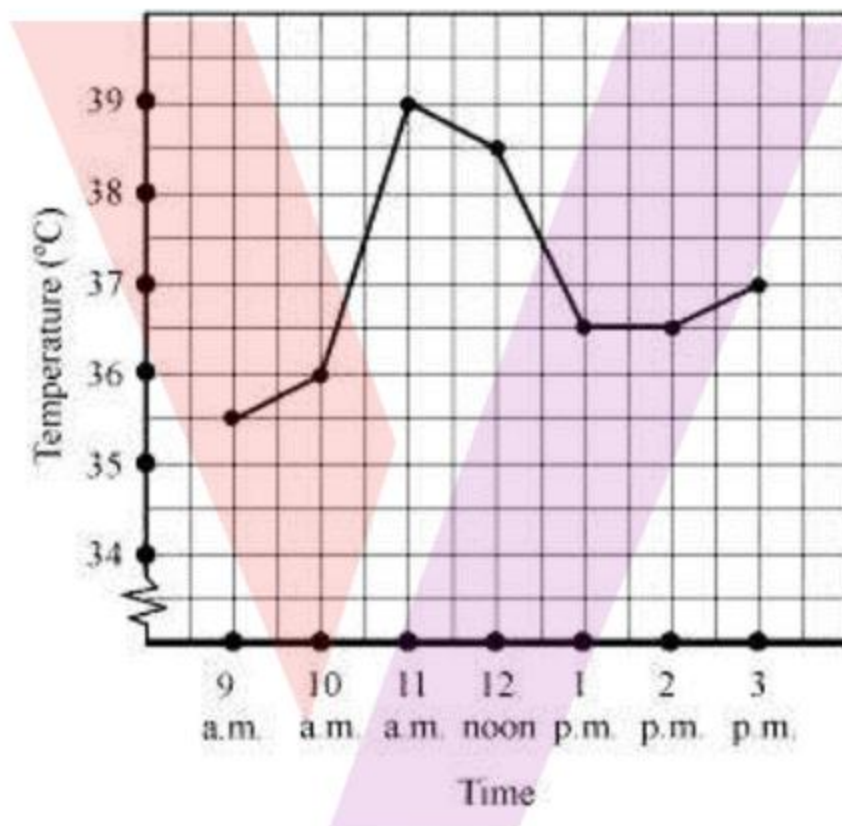# CBSE NCERT Solutions for Class 8 Mathematics Chapter 15

Back of Chapter Questions

Exercise 15.1

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 patients' temperature showed an upward trend?

Solution:

    (a)   From the given graph,

          we can observe that at 1 p.m., the patient's temperature was 36.5⁰C.

(b) From the given graph,

we can observe that the patient's temperature was 38.5°C at 12 noon.

(c) From the given graph,

we can observe that the patient's temperature was same at 1 p.m. and 2 p.m.

(d) From the given graph,

we can see that the graph during the time 1 p.m. and 2 p.m. is parallel to x-axis which means the temperature is constant during 1 p.m. to 2 p.m.

The temperature at 1 p.m. and 2 p.m. is 36.5°C.

So, the temperature at 1:30 p.m. is also 36.5°C.

(e) From the given graph. We can infer that during the following periods, the patient's temperature showed an upward trend.

9 a.m. to 10 a.m., 10 a.m. to 11 a.m., 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 its previous year?
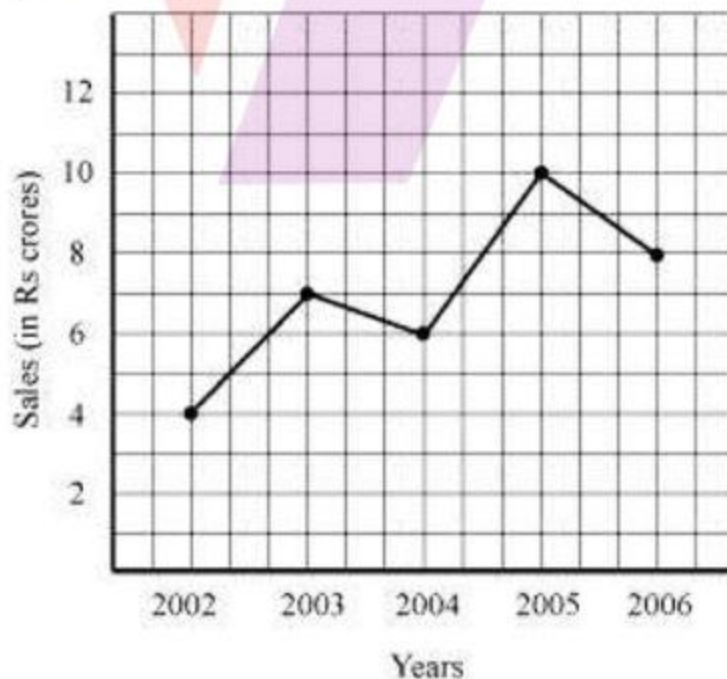
Solution:

(a) From the given figure,

    (i) In 2002, the sales were ₹4 crores.

    (ii) In 2006, the sales were ₹8 crores.

(b) From the given figure,

    (i) In 2003, the sales were ₹7 crores.

    (ii) In 2005, the sales were ₹10 crores.

(c) From the given figure, we can observe

In 2002, the sales were ₹4 crores.

In 2006, the sales were ₹8 crores.

Difference between the sales in 2002 and 2006 $= ₹(8-4)$ crores.

$= ₹4$ crores.

Hence, the difference between the sales in 2002 and 2006 is ₹4 crores

(d) From the figure,

In 2002, the sales were ₹4 crores.

In 2003, the sales were ₹7 crores.

In 2004, the sales were ₹6 crores.

In 2005, the sales were ₹10 crores

In 2006, the sales were ₹8 crores.

∴ Difference between the sales of the year 2006 and 2005 $=$ ₹$(10-8)$crores $= 2$ crores

Difference between the sales of the year 2005 and 2004 $= ₹(10-6)$ crores $= 4$ crores.

Difference between the sales of the year 2004 and 2003 $= ₹(7-6)$crores $= 1$ crore.

Difference between the sales of the year 2003 and 2002 $= ₹(7-4)$crores $= 3$ crores.

Hence, the greatest difference was maximum in year 2005 as compared to its previous year 2004.

3. For an experiment in Botany, two different plants, plant A and plant B were 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.
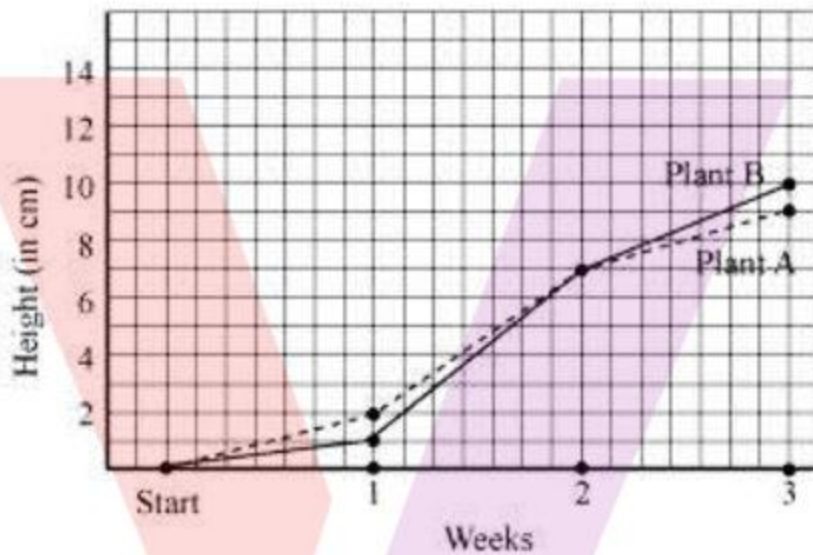
Solution:

(a)

(i)   We can observe from the given graph that the height of plant A was 7 cm after 2 weeks.

(ii)   We can observe from the given graph that the height of plant A was 9 cm after 3 weeks.

(b)

(i)   We can observe from the given graph that the height of plant B was 7 cm after 2 weeks.

(ii)   We can observe from the given graph that the height of plant B was 10 cm after 3 weeks.

(c)   From the given figure,

Height of plant A after 2 weeks = 7 cm.

Height of plant A after 3 weeks = 9 cm.

∴ Growth of plant A during 3rd week = 9 − 7 cm = 2 cm.

Hence, plant A grew 2 cm during 3rd week

(d)   From the given figure,

Height of plant B after 2 weeks = 7 cm.

Height of plant B after 3 weeks = 10 cm.

∴ Growth of plant B from the end of the 2nd week to the end of the 3rd week

= 10 − 7 cm

= 3 cm.

Hence, plant B grew 3 cm from the end of the 2nd week to the end of the 3rd week

(e)   From the given figure,

Growth of plant A during 1st week = 2 − 0 cm

= 2 cm

Growth of plant A during 2nd week = 7 − 2 cm

= 5 cm.

Growth of plant A during 3rd week = 9 − 7 cm

= 2 cm.

Thus, growth of plant A is maximum in 2nd week.

(f)   From the given figure,

Growth of plant B during 1st week = 1 − 0 cm

= 1 cm

Growth of plant B during 2nd week = 7 − 1 cm

= 6 cm.

Growth of plant B during 3rd week = 10 − 7 cm

= 3 cm.

Thus, growth of plant B is least in 1st week.

4.   The following graph shows the temperature forecast and the actual temperature for each day of a 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?
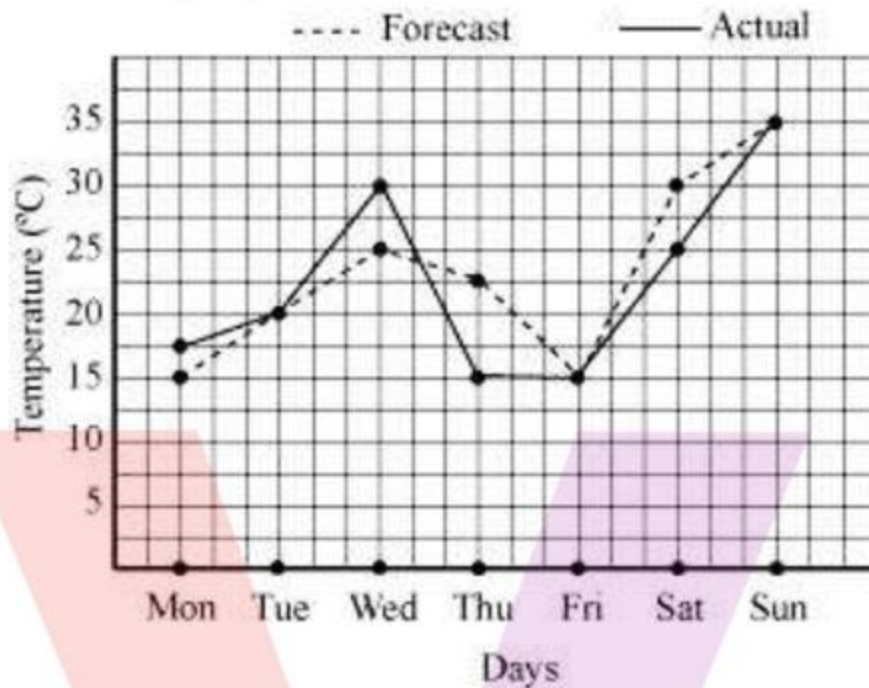
Solution:

(a) From the given graph, we can observe that the forecast temperature is same as actual temperature on Tuesday, Friday and Sunday.

(b) We can observe from the given graph that maximum forecast temperature during the week is 35°C.

(c) We can observe from the given graph that minimum actual temperature during the week is 15°C.

(d) We can observe from the given graph that the actual temperature differs the most from the forecast temperature on Thursday which is 25°C − 15°C = 10°C

5. Use the tables below to draw linear graphs.

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

years	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
Number of Men	12	12.5	13	13.2	13.5
Number of Women	11.3	11.9	13	13.6	12.8

Solution:

(a) Let us consider graph with scale of x-axis, 2 units = 1 year and for *y*-axis, 1 unit = 2 days.
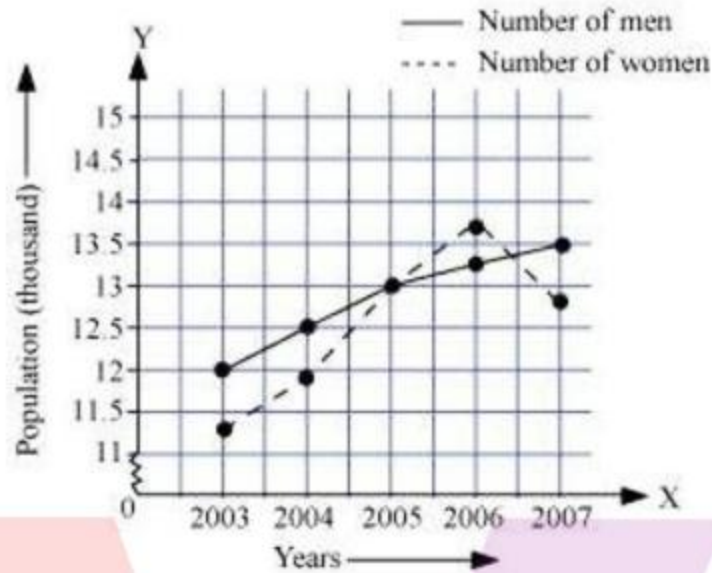
We can represent the years on *x*-axis and number of days on *y*-axis. The graph of the given data is given as below:
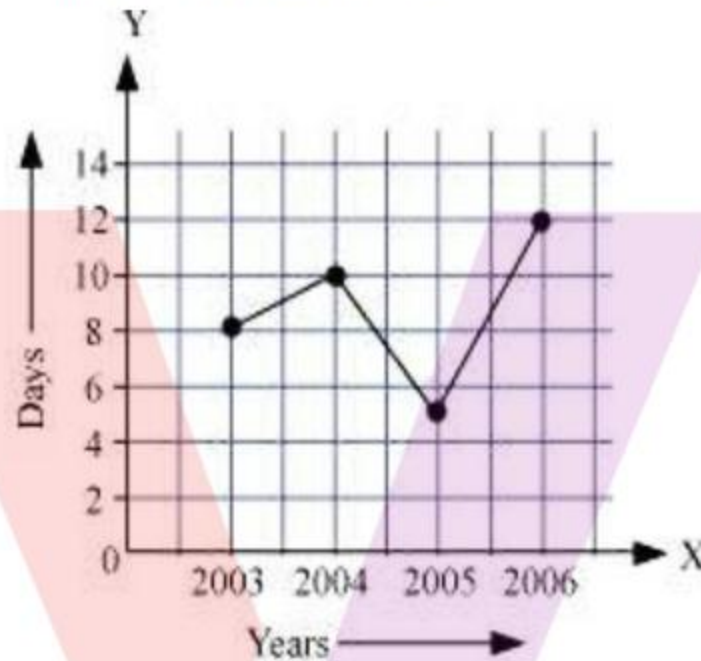
Hence, as per given information the linear graph is drawn as above.

(b) Let us consider graph with scale of x-axis, 2 unit = 1 year and for *y*-axis, 1 unit = 0.5 thousand.

We can represent the years on x-axis and population on *y*-axis. The graph of the given data is as follows

Hence, as per given information the linear graph is drawn as above.

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?
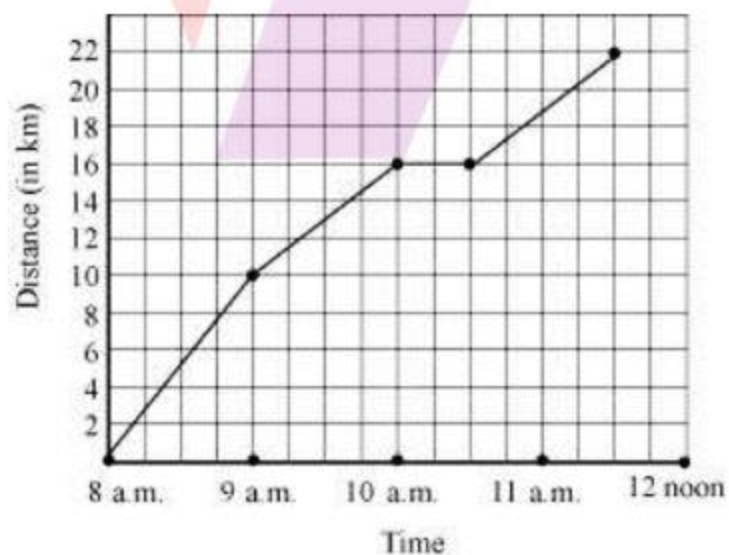
Solution:

(a)   Scale taken for the time axis is 4 units= $9 - 8 = 10 - 9 = 11 - 10 =$ 1 hour

Hence, the scale taken for the time x-axis is 1 hour= 4 units.

(b)   He travelled from 8 a.m. to 11: 30 a.m.

Hence, the courier-person took 3.5 hours to travel.

(c)   We can observe from the graph that the merchant's place is 22 km far from the town.

(d)   The graph is parallel to x-axis from 10 a.m. to 10: 30 a.m. which means the person did not travel any distance during this time period.
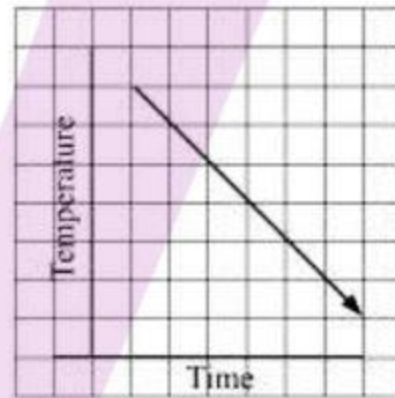
Hence, the person stopped on his way from 10 a.m. to 10: 30 a.m.

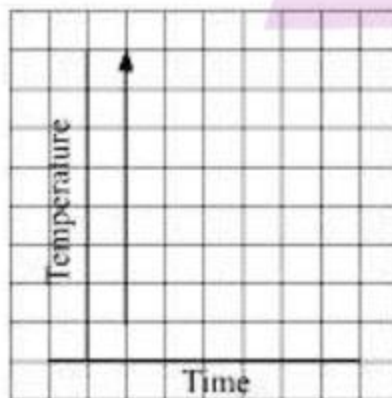(e)   From the given graph, we can observe that he rides fastest during 8 a.m. to 9 a.m.

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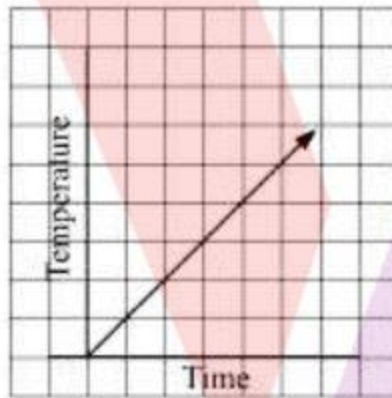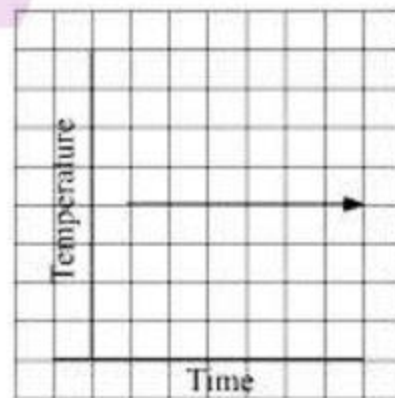

(i)

(ii)

(iii)

(iv)

Solution:

i. From the given figure, we can observe that it is a time –temperature graph.

Hence, we can infer that as the time increases, temperature also increases.

ii. From the given figure, we can observe that it is a time –temperature graph.

Hence, we can infer that as the time increases, temperature decreases.

iii. From the given graph, it shows different temperatures at the same time which is not possible.

Hence, this is not a valid time-temperature graph.

iv. From the given figure, this can be a time-temperature graph.

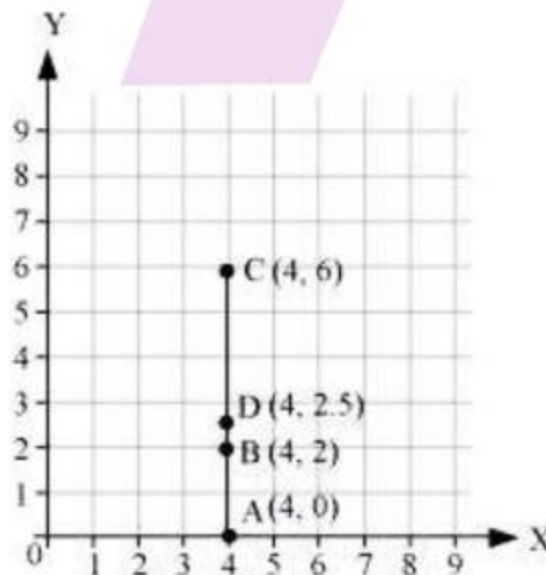Hence, as the temperature increases, time remains constant which is possible.

EXERCISE 15.2

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:

(a) The given points can be plotted as below:

From the above graph, it can be observed from the graph that the given points lie on the same line.

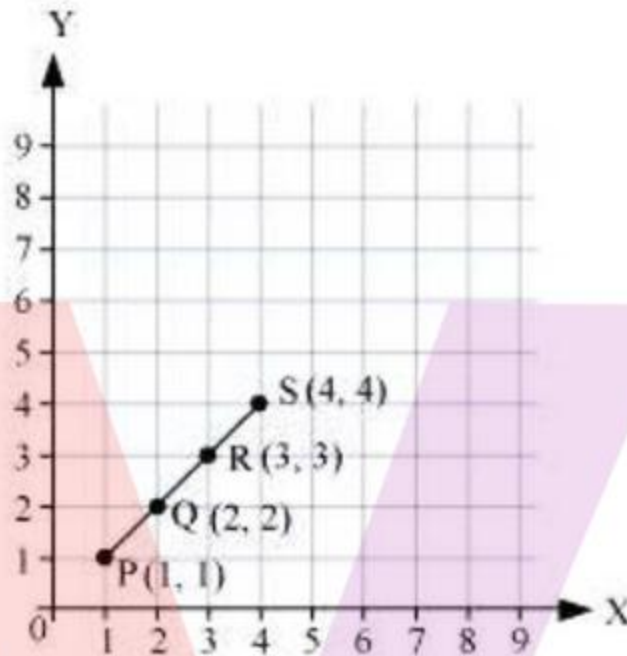Hence, it is verified that the given points lie on same line.

(b)   The given points can be plotted as below:

From the above graph, it can be observed from the graph that the given points lie on the same line.

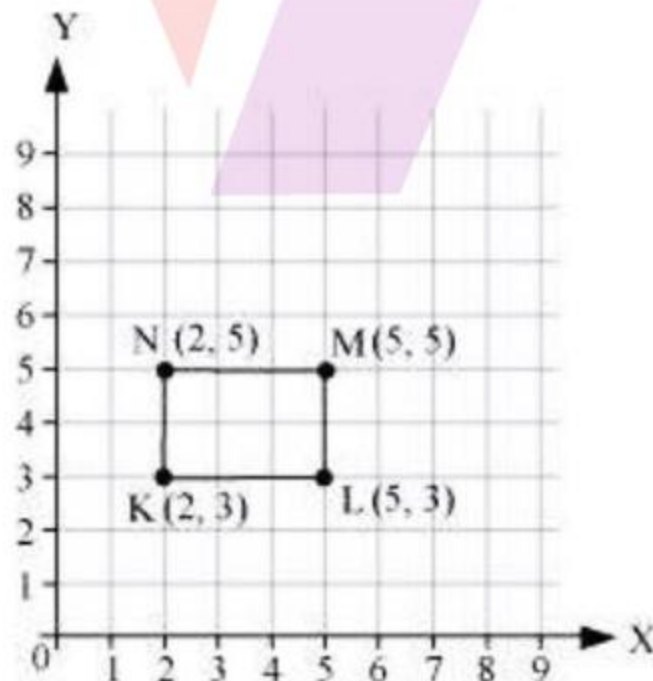Hence, it is verified that the given points lie on same line.

(c)   The given points can be plotted as below:

From the above graph, it can be observed from the graph that the given points do not lie on the same line.

Hence, it is verified that the given points do not lie on same 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:

   Let us draw the graph and locate the points $(2, 3)$ and $(3, 2)$.

    Now, extend the line which meets towards x- axis and y-axis.
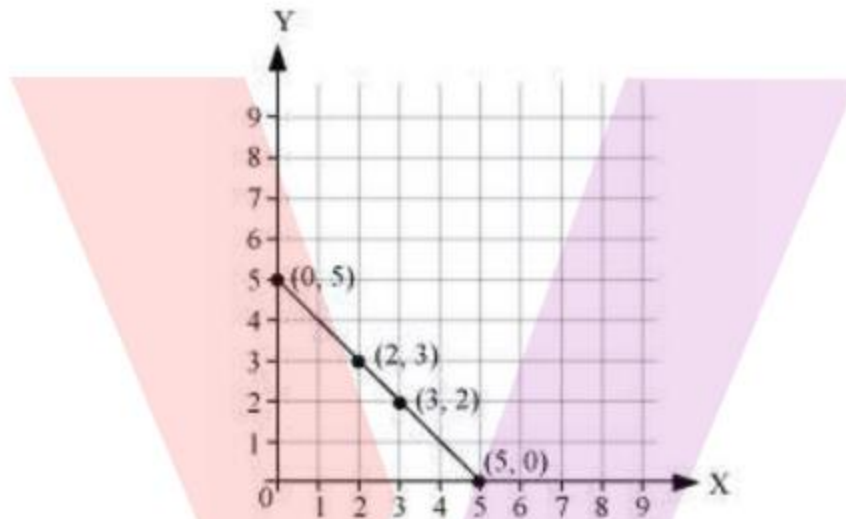
    We can observe from the graph, that the line passing through $(2, 3)$ and $(3, 2)$ meets the x-axis at $(5, 0)$ and the y-axis at $(0, 5)$.

    Therefore, $(5, 0)$ and $(0, 5)$ are the required coordinates of the points at which the line meets the x- axis and y-axis.

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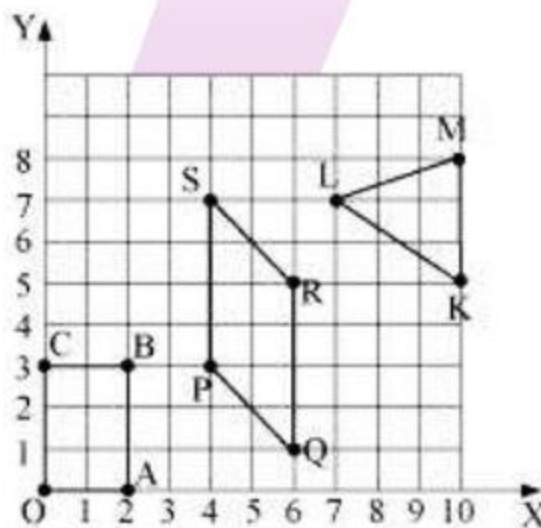
Solution:

From the given graph,

The coordinates of the vertices are:

(i)   O is at origin

Hence, the coordinates of O are $(0, 0)$.

(ii)   A is at distance of 2 units from origin along x-axis and 0 units along y-axis.

Hence, the coordinates of A are $(2, 0)$.

(iii)   B is at distance of 2 units along x-axis and 3 units along y-axis.

Hence, the coordinates of B are $(2, 3)$.

(iv)   C is at distance of 0 units along x-axis and 3 units along y-axis.

Hence, the coordinates of C are $(0,3)$

(iv)   P is at distance of 4 units along x-axis and 3 units along y-axis.

Hence, the coordinates of P are $(4, 3)$

(v)   Q is at distance of 6 units along x-axis and 1 unit along y −axis.

Hence, the coordinates of Q are $(6, 1)$

(vi)   R is at distance of 6 units along x-axis and 5 units along y-axis.

Hence, the coordinates of R are $(6, 5)$

(vii)   S is at distance of 4 units along x-axis and 7 units along y-axis.

Hence, the coordinates of S are $(4, 7)$

(viii) K is at distance of 2 units along x-axis and 3 units along y-axis.

Hence, the coordinates of K are $(10,5)$

(ix)   L is at distance of 7 units along x-axis and 7 units along y-axis.

Hence, the coordinates of L are L $(7,7)$

(x)   M is at distance of 10 units along x-axis and 8 units along y-axis.

Hence, the coordinates of M are $(10, 8)$

Therefore, the coordinate points of the adjoining figures are given as above.

4.   State whether True or False. Correct 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 y-axis.

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

Solution:

(i) True

As x coordinate is zero and y-coordinate is non-zero, point can be represented as $(0, y)$ which lies on y axis.

(ii) False

As y- coordinate is zero and x-coordinate is non-zero, point can be represented as $(x, 0)$ which lies on x axis.

(iii) True

EXERCISE 15.3

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

(a) Cost of apples

Number of apples	1	2	3	4	5
Cost (in ₹)	5	10	15	20	25

(b) Distance travelled by a 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 ₹)	1000	2000	3000	4000	5000
Simple Interest (in ₹)	80	160	240	320	400

(i) Does the graph pass through the origin?

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

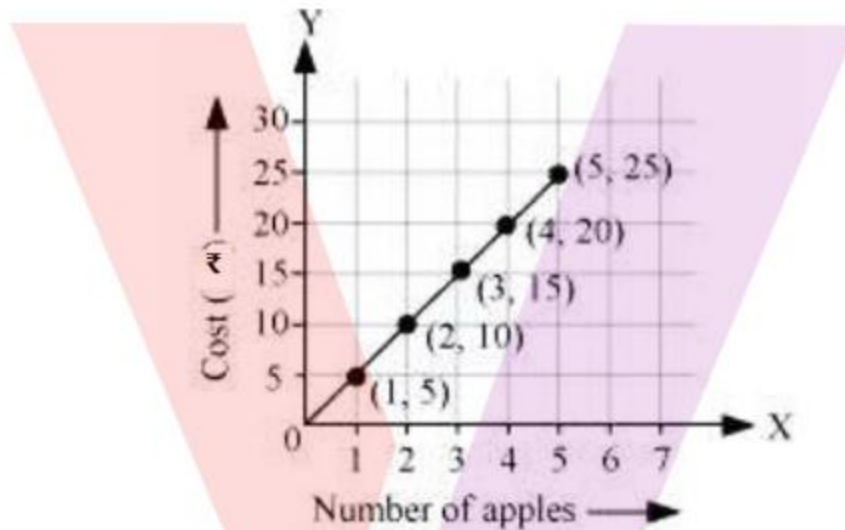(iii)   To get an interest of ₹ 280 per year, how much money should be deposited?

Solution:

(a)   Let us draw the graph by taking number of apples on x-axis and cost in rupees on y-axis.

Now, for a suitable scale,

We take x-axis as 1 unit = 1 apple and y-axis as 1 unit = ₹ 5

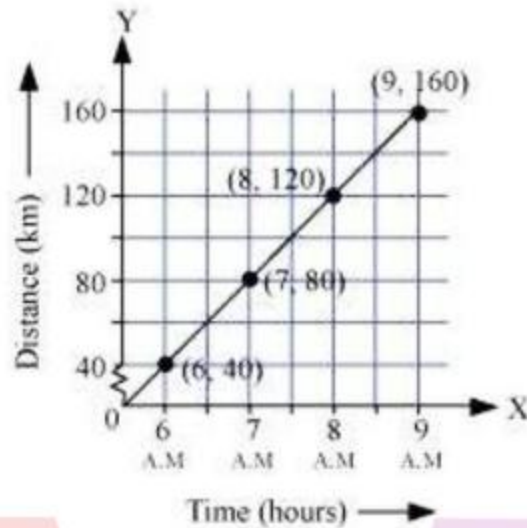From the given data, the graph is as follows

Hence, the above figure is the required graph.

(b)   Let us draw the graph by taking Time (in hours) on x-axis and Distance (in km) on y-axis.

Now, for a suitable scale,

We take x-axis as 2 units = 1 hour and y-axis as 2 units = 40 kms

From the given data, the graph follows as below:

(i) We can observe from the above graph that the car covered a distance of 20 km during 7:30 a.m. to 8 a.m.

(ii) From the above graph, at 7:30 a.m. the car covered a distance of 100 km.

(c) Let us draw the graph by taking Deposit (₹) on x-axis and Simple interest (₹) on y-axis.

Now, for a suitable scale,

We take x-axis as 1 unit = ₹1000 and y-axis as 1 unit = ₹80

From the given data, the graph follows as below:
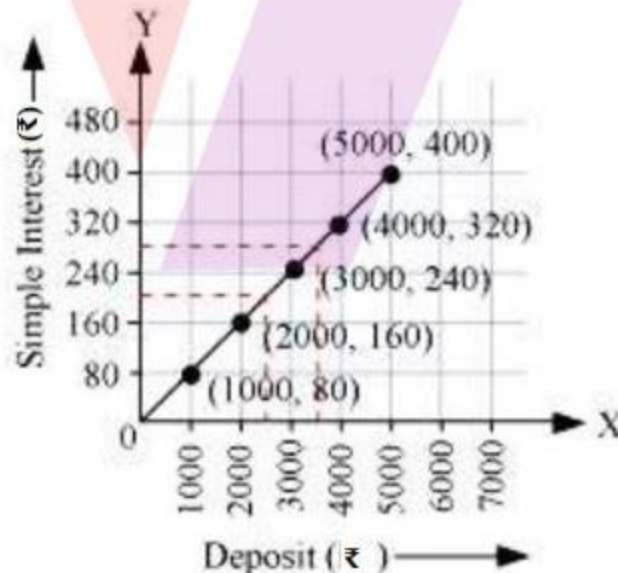
We can observe the following points from the graph

(i) Yes, the graph passes through the origin $(0, 0)$.

(ii) The interest earned in a year on a deposit of ₹2500 is ₹200.

(iii) To get an interest of ₹ 280 per year, ₹ 3500 must be deposited.

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 a linear graph?

(ii)

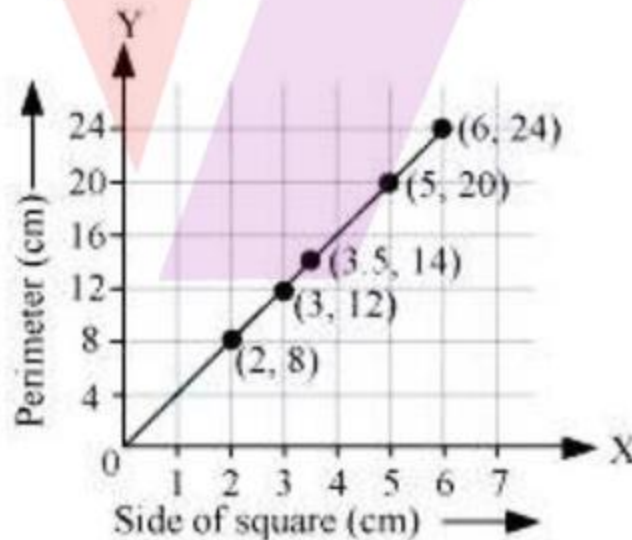| Side of square (in cm)	2	3	4	5	6
Area (in cm²)	4	9	16	25	36

Is it a linear graph?

Solution:

(i) Let us draw the graph by taking side of a square (cm) on x-axis and perimeter (cm) on y-axis.

Now, for a suitable scale,

We take x-axis as 1 unit = 1 cm and y-axis as 1 unit = 4 cm.

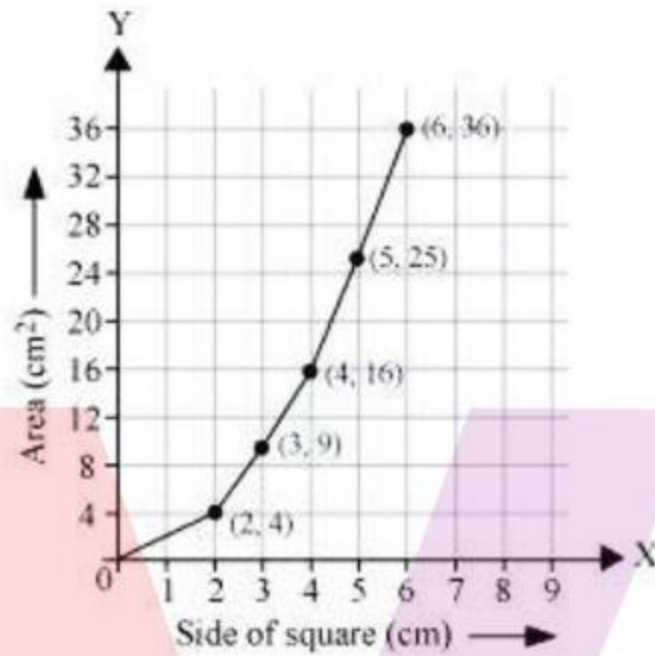From the given data, the graph follows as below:

Hence, it is a linear graph.

(ii) Let us draw the graph by taking side of a square (cm) on x-axis and area (cm²) on y-axis.

Now, for a suitable scale,

We take x-axis as 1 unit $= 1$ cm and y-axis as 1 unit $= 4$ cm^2.

From the given data, the graph follows as below:

Hence, it is not a linear graph.