Chapter 18 : Introduction to Graphs

ANSWER KEYS

EXERCISE 18.1

1.

	Points	Abscissa	Ordinate
(*i*)	(2, 3)	2	3
(*ii*)	(– 5, 2)	– 5	2
(*iii*)	(– 3, – 7)	– 3	– 7
(*iv*)	(6, – 4)	6	– 4
(*v*)	(3, – 2)	3	– 2
(*vi*)	(– 7, – 9)	– 7	– 9

2.

	Abscissa	Ordinate	Ordered pair
(*i*)	1	– 3	(1, – 3)
(*ii*)	– 4	0	(– 4, 0)
(*iii*)	0	7	(0, 7)
(*iv*)	3	– 5	(3, – 5)
(*v*)	– 6	– 2	(– 6, – 2)

3. (*i*) (2, – 3) : IV quadrant

(*ii*) (3, 2) : I quadrant

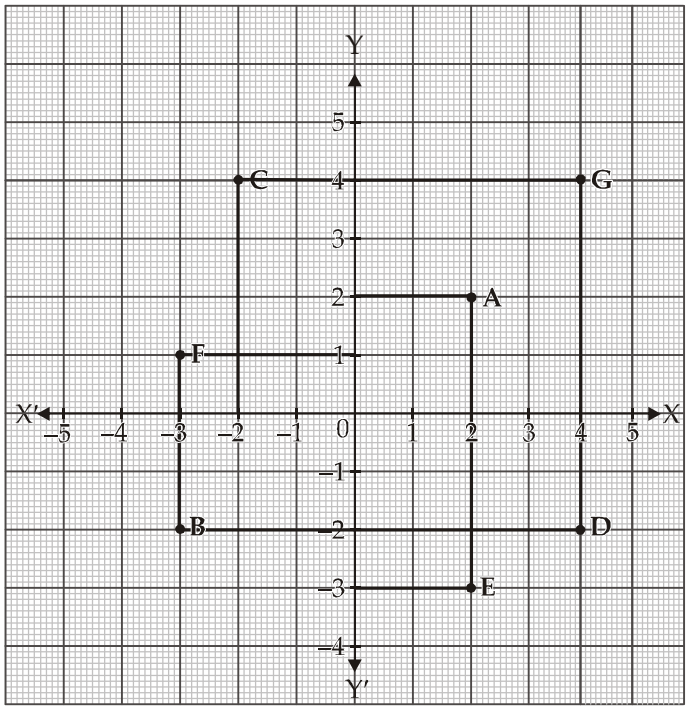
(*iii*) (– 4, 5) : II quadrant

(*iv*) (– 5, – 7) : III quadrant

(*v*) (5, – 2) : IV quadrant

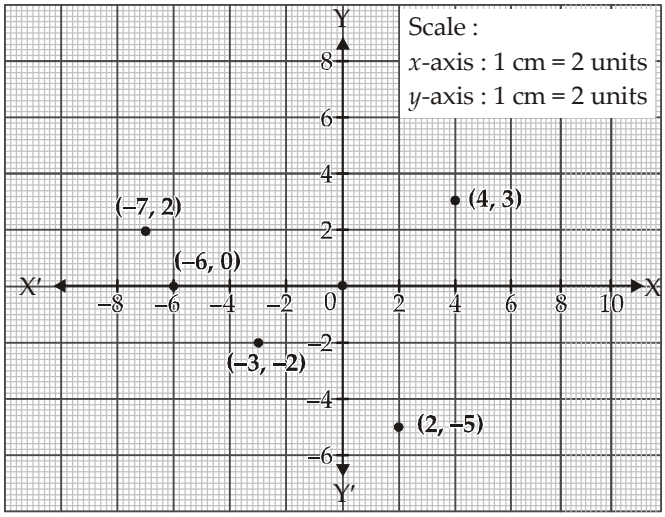
(*vi*) (– 2, 4) : II quadrant

4. The distances of a point from the *x*-axis and the *y*-axis represent the coordinates of the point.



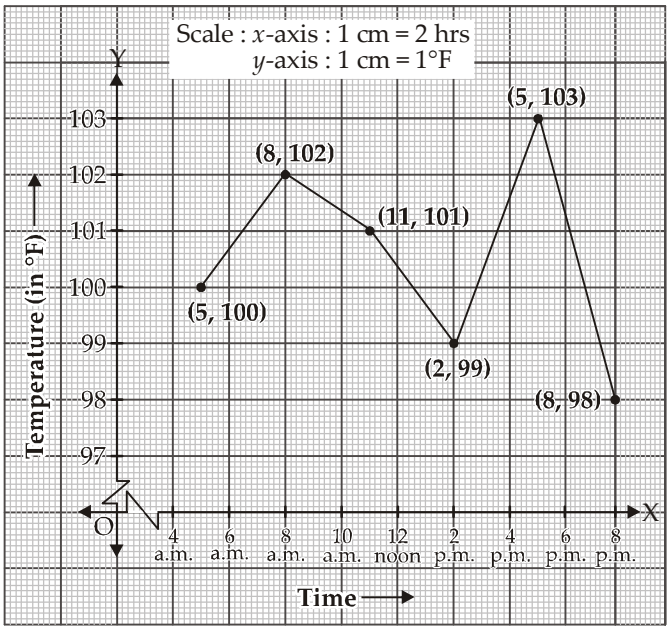
A(2, 2), *B*(– 3, – 2), *C*(– 2, 4), *D*(4, – 2), *E*(2, – 3), *F*(– 3, 1), *G*(4, 4).

5.



EXERCISE 18.2

1. Draw two axes *OX* and *OY* and mark the same. We take time along *x*-axis and temperature (in °F) along the *y*-axis by choosing suitable scale.



2. (*i*) 1 cm = 1 hour

(*ii*) The person took 6 hours to cover the distance.

(*iii*) The distance between town and sub-urban area is 20 km.

(*iv*) Distance covered during 7 a.m. to 8 a.m. = 4 km

Distance covered during 8 a.m. to 9 a.m. = 4 km

Distance covered during 9 a.m. to 10 a.m. = 2 km

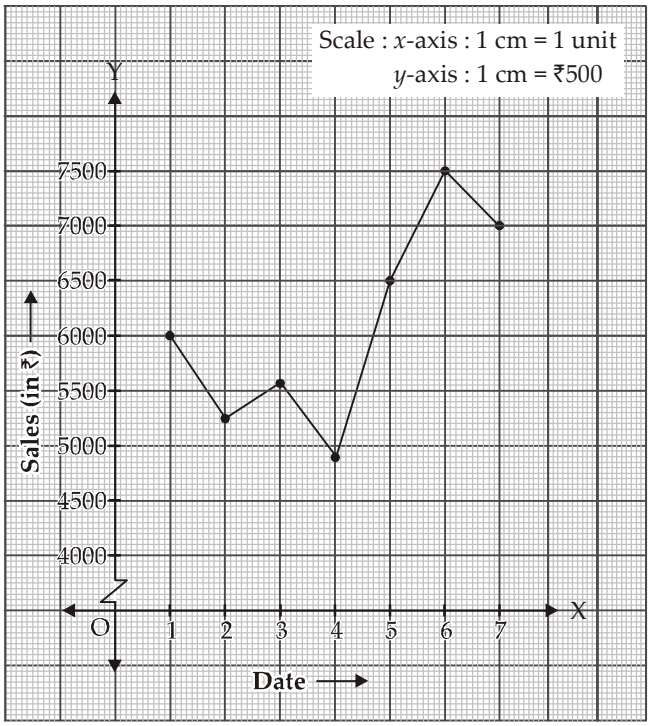
Distance covered during 10 a.m. to 11 a.m. = 5.2 km

Distance covered during 11 a.m. to 12 noon = 2.8 km

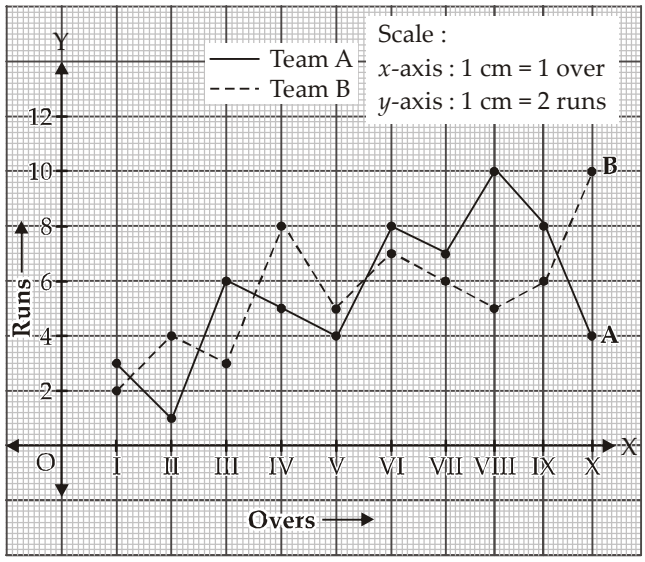
Distance covered during 12 noon to 1 p.m. = 2 km

Between 10 a.m. to 11 a.m., the person rode the cycle fastest.

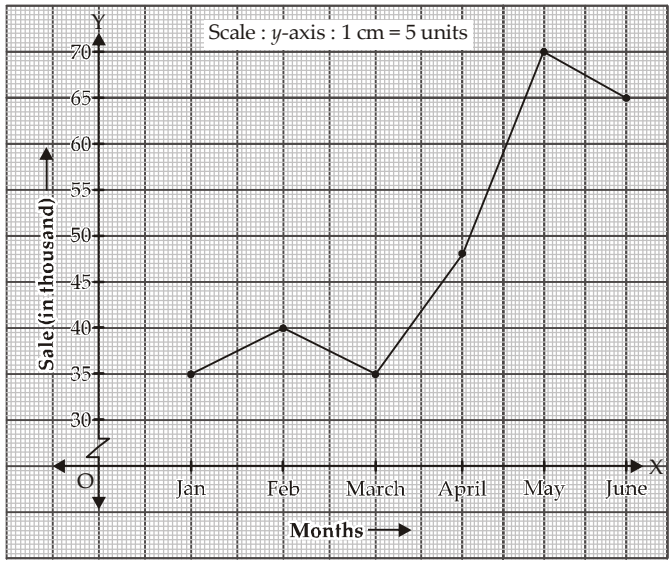
3. Draw two axes *OX* and *OY* and mark the same. We take dates along *x*-axis and sales (in ₹) along *y*-axis by choosing suitable scale.



4. Draw two mutually perpendicular axes *OX* and *OY*. Mark overs along the *x*-axis and runs scored by team *A* and team *B* along *y*-axis by choosing suitable scale.

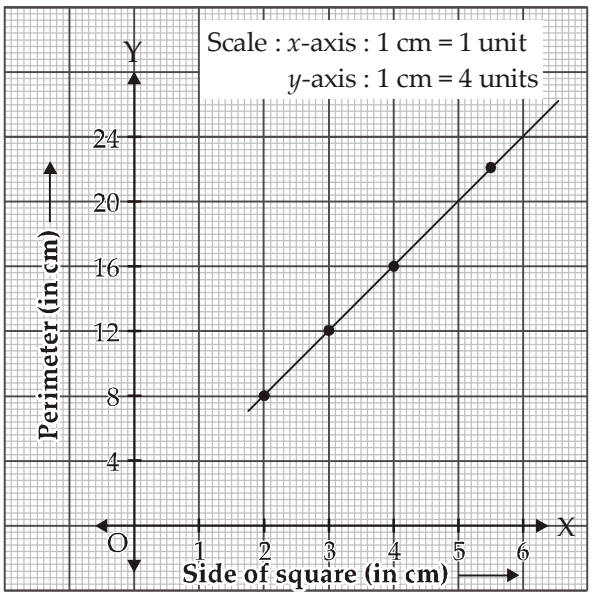


5. Draw two mutually perpendicular axes OX and OY. Mark months along x-axis and sale (in thousands) along y-axis by choosing suitable scale.



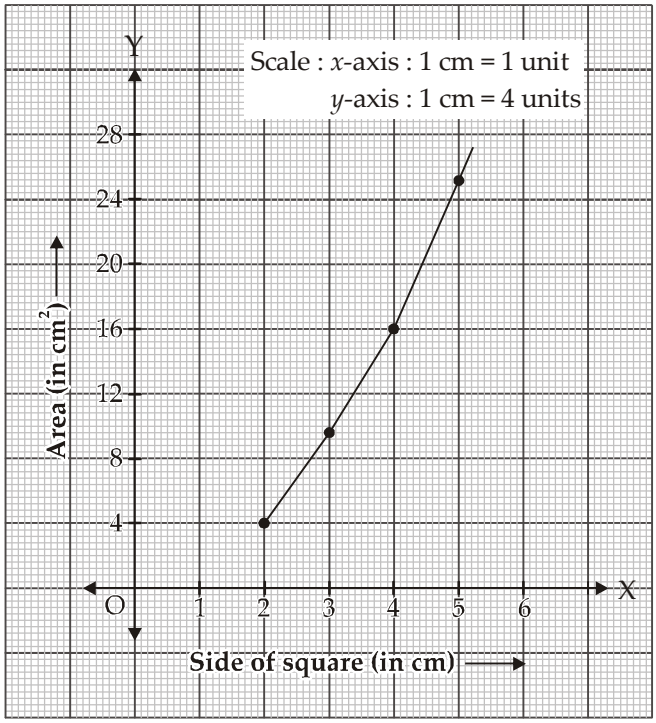
EXERCISE 18.3

1. The ordered pairs are (2, 8), (3, 12), (4, 16) and (5.5, 22). Plot these points on the graph paper. Join these points to get the required graph.



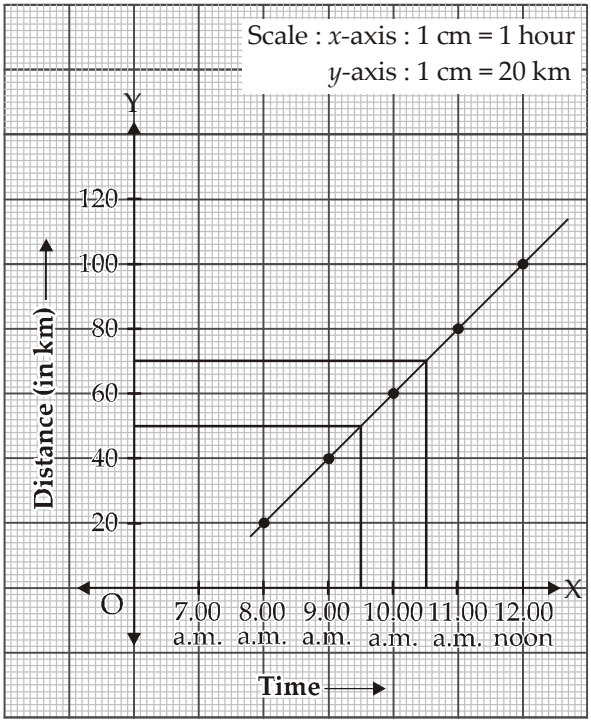
Yes, it is a linear graph.

2. The ordered pairs are (2, 4), (3, 9), (4, 16) and (5, 25). Plot these points on the graph. Join these points to get the required graph.



No, it is not a linear graph.

3. Draw two mutually perpendicular axes OX and OY. Mark time along x-axis and distance (in km) along y-axis by choosing suitable scale.



(*i*) Distance travelled at 9.30 a.m. = 50 km

Distance travelled at 10.00 a.m. = 60 km

The car travelled a distance of 10 km during the period 9.30 a.m. to 10 a.m.

(*ii*) Corresponding to 70 km on the vertical axis, we get the time to be 10.30 a.m. on the horizontal axis.

When the car had covered a distance of 70 km since its start, the time was 10.30 a.m.

4. We have,

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$\text{S.I.} = \frac{200 \times 5 \times T}{100}$$

[$\because$ P = ₹200 and R = 5% p.a. (given)]

$$\text{S.I.} = 10\ T$$

For different values of T, the corresponding values of S.I. are as follows:

When $T = 1 \Rightarrow$ S.I. $= 10 \times 1 = 10$

$T = 2 \Rightarrow$ S.I. $= 10 \times 2 = 20$

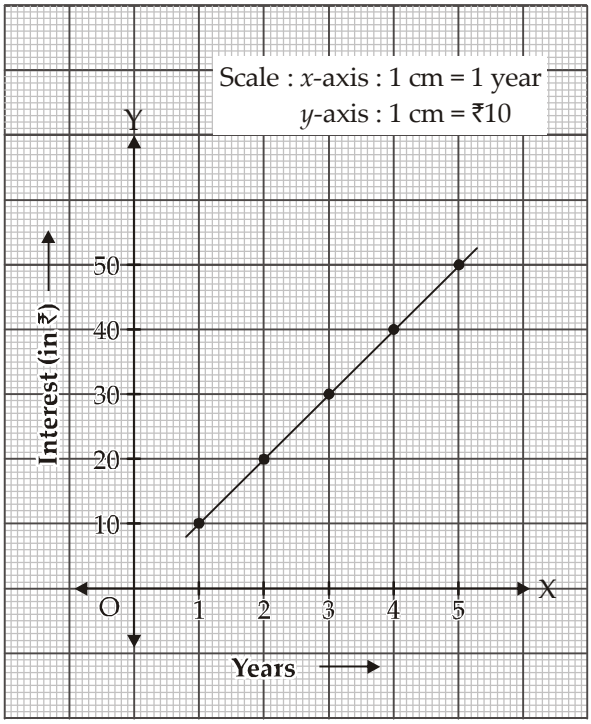
$T = 3 \Rightarrow$ S.I. $= 10 \times 3 = 30$

$T = 4 \Rightarrow$ S.I. $= 10 \times 4 = 40$

$T = 5 \Rightarrow$ S.I. $= 10 \times 5 = 50$... so on,

Years (T)	1	2	3	4	5
Simple Interest (S.I.)	10	20	30	40	50

The ordered pairs are (1, 10), (2, 20), (3, 30), (4, 40) and (5, 50). Plot these points on the graph paper. Join these points to get the required graph.



5. We have,

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$\Rightarrow$ Distance = Speed × Time

Distance = 50 × Time

[$\because$ Speed = 50 km/hr]

For different values of time, the corresponding values of distence are as follows:

When, Time = 1 $\Rightarrow$ Distance = 50 × 1 = 50

Time = 2 $\Rightarrow$ Distance = 50 × 2 = 100

Time = 3 $\Rightarrow$ Distance = 50 × 3 = 150

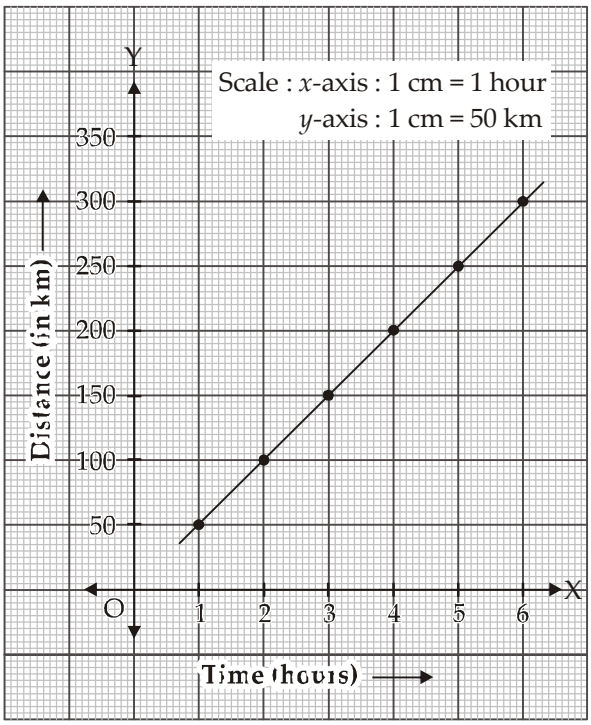
Time = 4 $\Rightarrow$ Distance = 50 × 4 = 200

Time = 5 $\Rightarrow$ Distance = 50 × 5 = 250

Time = 6 $\Rightarrow$ Distance = 50 × 6 = 300

Time (in hr.)	1	2	3	4	5	6
Distance (in km)	50	100	150	200	250	300

The ordered pairs are (1, 50), (2, 100), (3, 150), (4, 200), (5, 250) and (6, 300). Plot these points on the graph paper. Join these points to get the required graph.



6. We have,

Distance = Speed × Time

Distance = 30 × Time

[$\because$ Speed = 30 km/hr]

For different values of T, the corresponding values of distance are as follows:

When, Time = 1 $\Rightarrow$ Distance = 30 × 1 = 30

Time = 2 $\Rightarrow$ Distance = 30 × 2 = 60

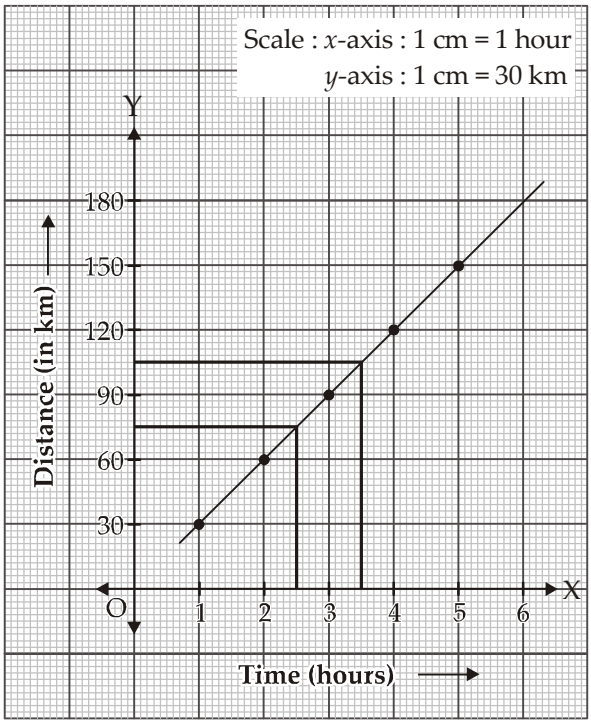
Time = 3 $\Rightarrow$ Distance = 30 × 3 = 90

Time = 4 $\Rightarrow$ Distance = 30 × 4 = 120

Time = 5 $\Rightarrow$ Distance = 30 × 5 = 150

Time (in hr.)	1	2	3	4	5
Distance (in km)	30	60	90	120	150

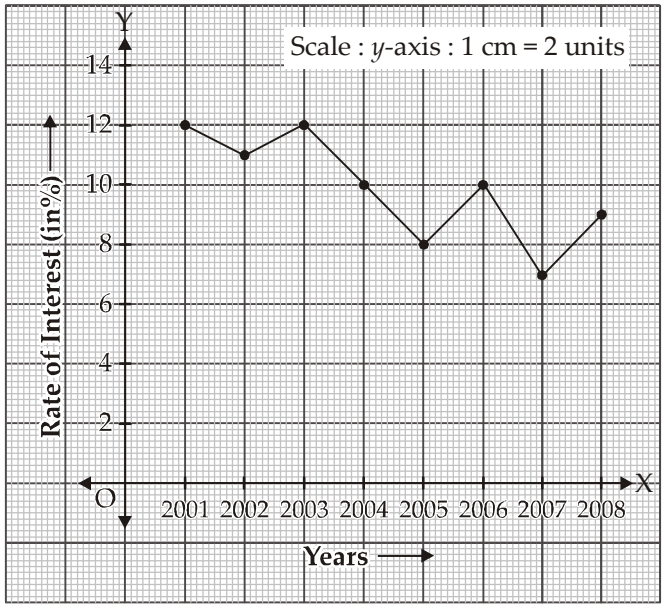
The ordered pairs are (1, 30), (2, 60), (3, 90), (4, 120) and (5, 150). Plot these points on the graph paper. Join these points to get the required graph.



(*i*) Corresponding to 75 km on the vertical axis, we get the time to be 2.5 hours on the horizontal axis. Thus, 2.5 hours are needed to cover 75 km.

(*ii*) Corresponding to $3\frac{1}{2}$ hours on the horizontal axis, the distance covered is 105 km on the vertical axis.

7. Mark years along x-axis and rate of interest along y-axis by choosing suitable scale. We draw required graph as follows.



MULTIPLE CHOICE QUESTIONS

1. Point (– 2, – 4) lies in III quadrant.
Hence, option (*c*) is correct.

2. Point (2, 4) lies in I quadrant.
Hence, option (*a*) is correct.

3. Point (2, – 4) lies in IV quadrant.
Hence, option (*d*) is correct.

4. Point (– 2, 4) lies in II quadrant.
Hence, option (*b*) is correct.

5. The abscissa of a point is the distance from y-axis.
Hence, option (*b*) is correct.

6. The graph $y = -3$ is a line parallel to x-axis.
Hence, option (*d*) is correct.

7. The equation representing x-axis is $y = 0$.
Hence, option (*b*) is correct.

8. The coordinates of any point in IV quadrant are (+, –).
Hence, option (*b*) is correct.

MENTAL MATHS CORNER

1. The coordinates of origin are (0, 0). **(True)**

2. A point whose y-coordinate is zero and x-coordinate is non-zero lies on the y-axis. **(False)**
Such a point lies on the x-axis.

3. A point whose x-coordinate is zero and y-coordinate is non-zero lies on the y-axis. **(True)**

4. Point (–3, –2) lies in the fourth quadrant. **(False)**

$\because$ Point (– 3, – 2) lies in the third quadrant.

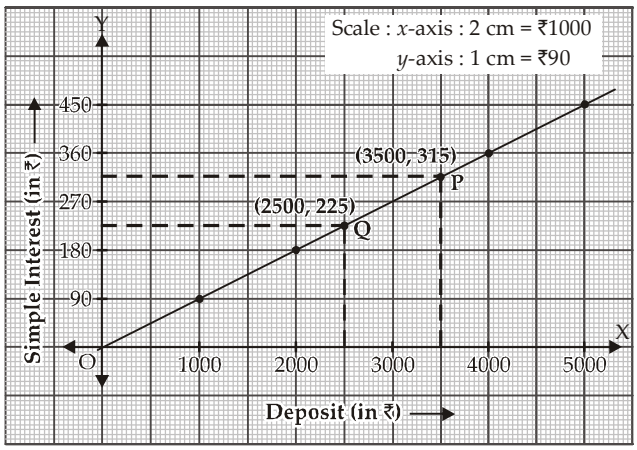
5. The graph of $y = x^2$ is a straight line. **(False)**

6. The ordinate of point (–2, 3) is 3. **(True)**

7. x-coordinate is also called the abscissa. **(True)**

REVIEW EXERCISE

1. (*i*) Draw two mutually perpendicular axes OX and OY. Mark deposit amount along x-axis and simple interest along y-axis by choosing suitable scale.



(*ii*) Yes, the graph passes through origin.

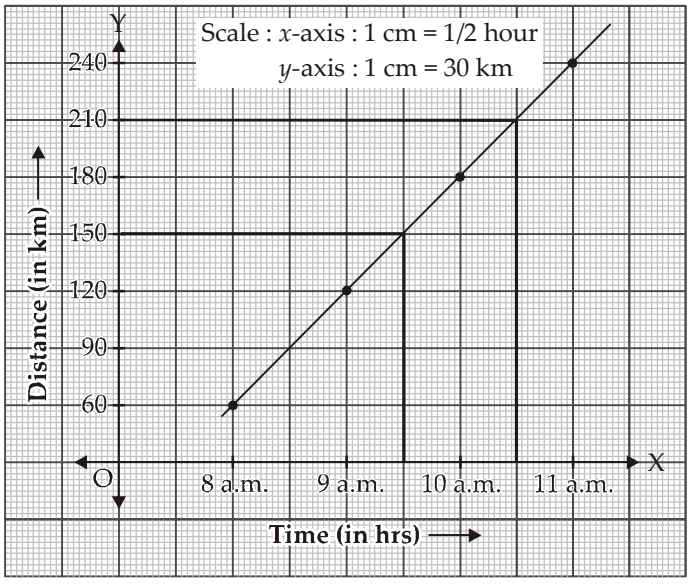
(*iii*) Corresponding to ₹3500 on the horizontal axis, we get the simple interest to be ₹315 on the vertical axis.

The interest on ₹3500 for a year is ₹315.

(*iv*) Corresponding to ₹225 on the vertical axis, we get the deposit to be ₹2500 on the horizontal axis.

₹2500 should be deposited to get an interest of ₹225.

2. We draw the linear graph as follows:



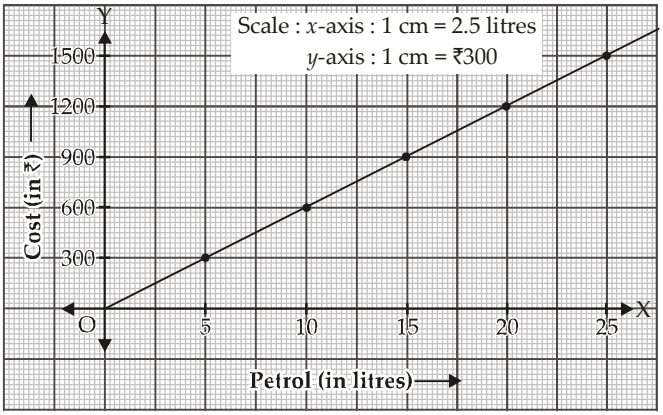
(*i*) Distance covered at 9.30 a.m. = 150 km

Distance covered at 10.00 a.m. = 180 km

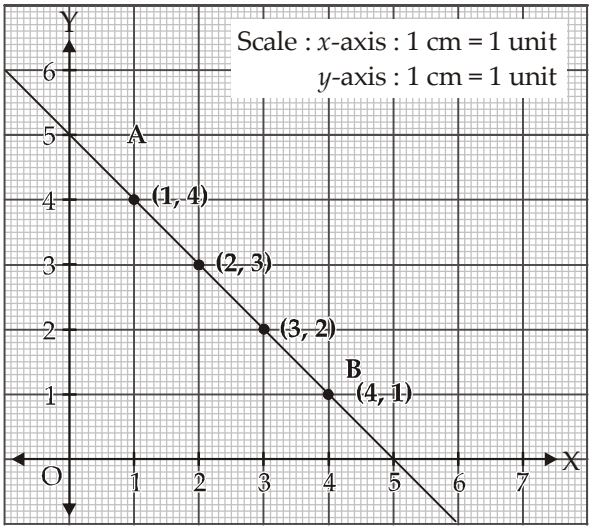
The car travelled (180 – 150) km = 30 km during the period 9.30 a.m. to 10.00 a.m.

(*ii*) Corresponding to 210 km on the vertical axis, we get the time to be 10.30 a.m. on the horizontal axis. At 10.30 a.m., the car had covered a distance of 210 km.

3. We draw the linear graph of the given data as follows:



4.



First, we plot the points (2, 3) and (3, 2) on a graph paper. We extend the line on both directions. It cuts x-axis at a distance 5 units from the origin and y-axis at a distance of 5 units from the origin.

The coordinates of point where line cuts x-axis are (5, 0).

The coordinates of point where line cuts y-axis are (0, 5).

If we plot the points (1, 4) and (4, 1). We see that the points lie on the line.

The given line passes through (1, 4) and (4, 1).

5. (*i*) The sales were 12 crores and 15 crores in the year 2008 and 2010 respectively.

(*ii*) The sales in 2011 = 12 crores

The sales in 2007 = 6 crores

Difference in sales = (12 – 6) crores = 6 crores.

(*iii*) In 2010, the sale was maximum.

6.

x	0	–	2	3	–
y	3	5	7	–	13

$\because \quad 2x - y + 3 = 0$

if $y = 5$, then

$2x - 5 + 3 = 0$

$\Rightarrow \quad 2x - 2 = 0$

$2x = 2$

$\Rightarrow \quad x = 1$

If $x = 3$, then

$2 \times 3 - y + 3 = 0$

$\Rightarrow \quad 6 - y + 3 = 0$

$\Rightarrow \quad y = 9$

If $y = 13$, then

$2x - 13 + 3 = 0$

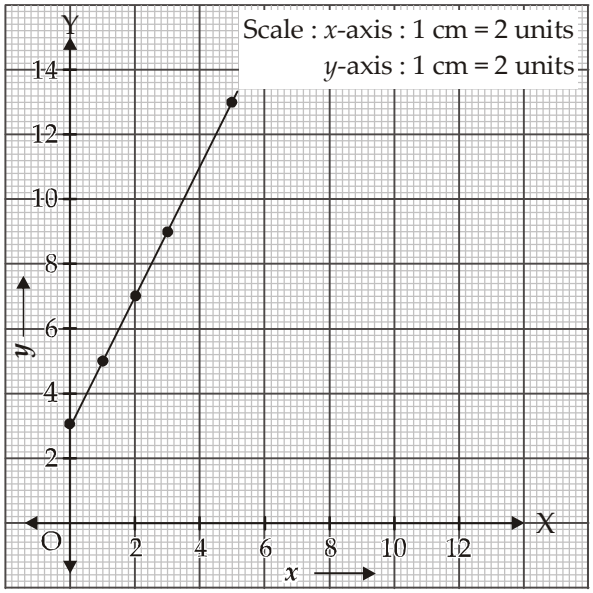
$\Rightarrow \quad 2x - 10 = 0$

$\Rightarrow \quad 2x = 10$

$\Rightarrow \quad x = 5$

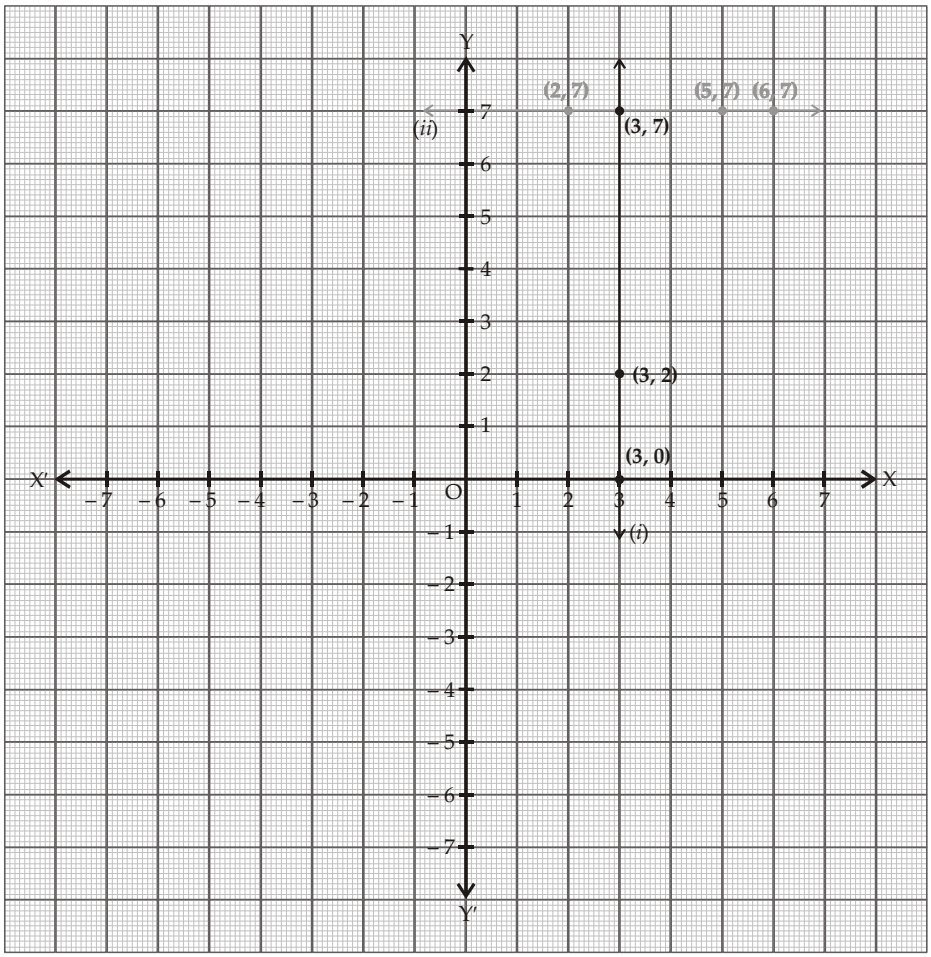
x	0	**1**	2	3	**5**
y	3	5	7	**9**	13

The ordered pairs are (0, 3), (1, 5), (2, 7), (3, 9) and (5, 13). Plot these points on a graph paper. Join these points to get the required graph.



HOTS QUESTIONS

1.



(*i*) These lie on a line since the graph obtained by joining the plotted points is a line. It is parallel to the *x*-axis.

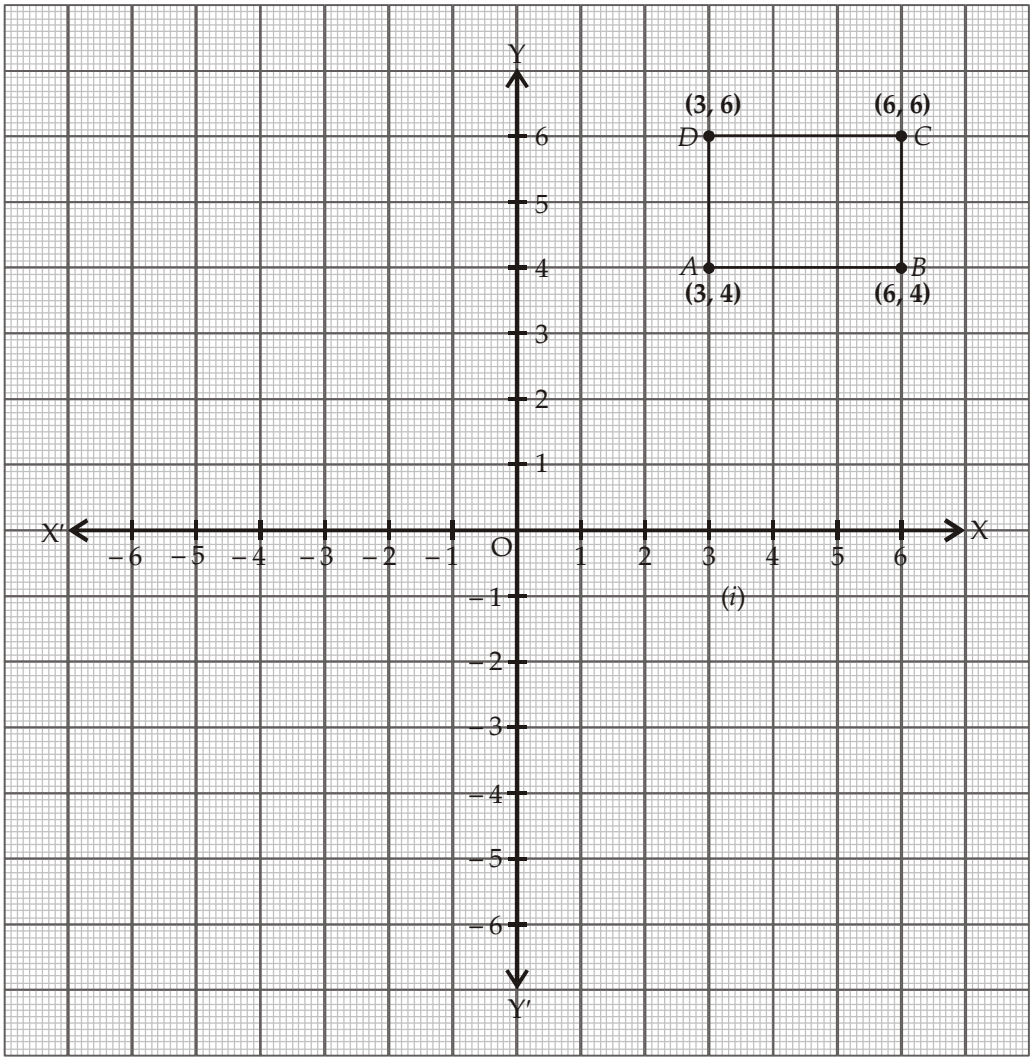
(*ii*) These lie on a line since the graph obtained by joining the plotted points is a line. It is parallel to the *y*-axis.

2. (*i*) A point whose *x*-coordinate is zero lies on *y*-axis.

(*ii*) A point whose *y*-coordinate is zero lies on *x*-axis.

(*iii*) A point whose both the coordinates are zero is origin.

3.



AB = 3 units, *BC* = 2 units, *CD* = 3 units, *DA* = 2 units.

The required figure *ABCD* is a rectangle.

∵ *AB* = *CD*, *BC* = *DA*.