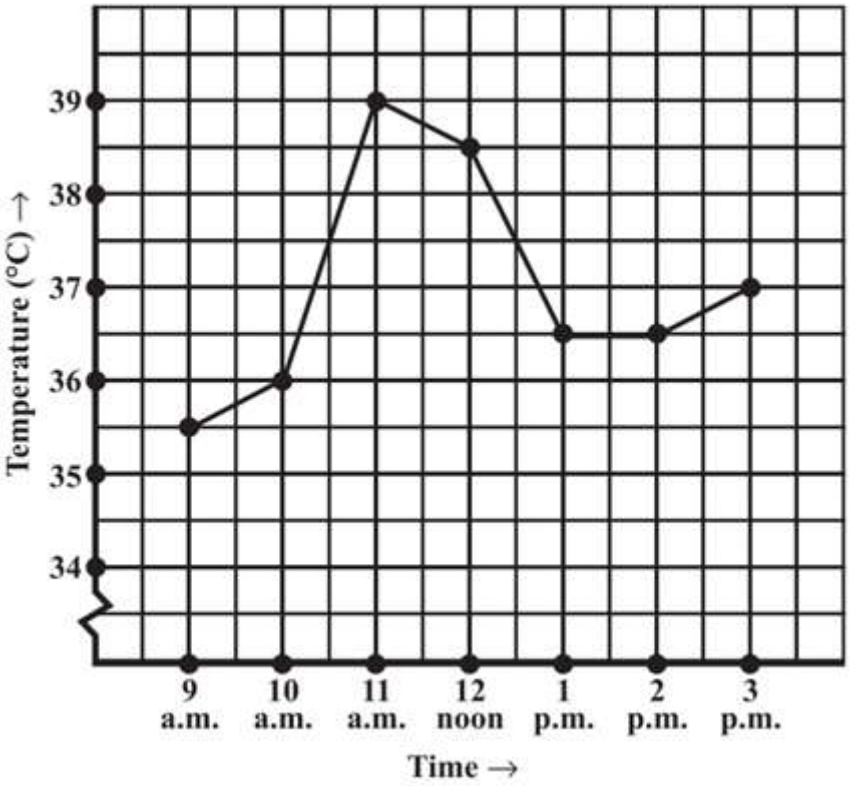
# Introduction to Graphs: Exercise 15.1

**Q.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?**

***Sol.*** From the graph:
(a) Patient's temperature at 1 p.m. was 36.5° C.

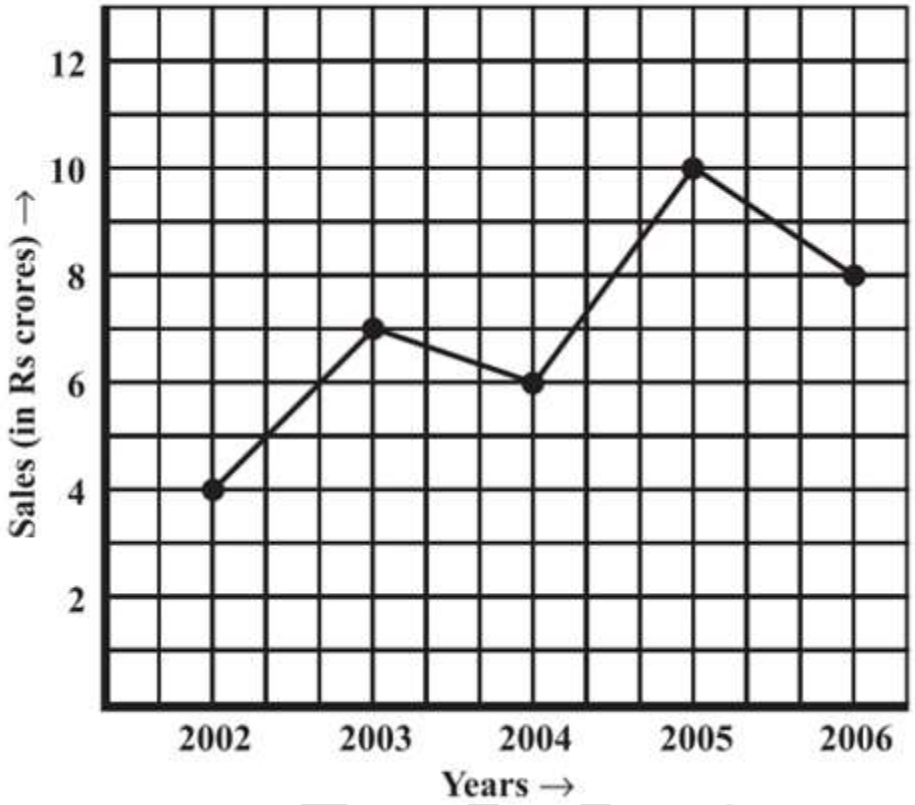
(b) From the graph, patient's temperature was 38.5° C at the 12 noon.

(c) At1 p.m. and 2 p.m., patient's temperature was the same.

(d) At 1.30 p.m., patient's temperature was 36.5° C. This temperature was constant between time 1 p.m. and 2 p.m.
So, it will remain constant at 1.30 p.m. too.

(e) The time periods during which the patients' temperature showed an upward trend: 9 a.m. to 10 a.m., 10 a.m. to 11 a.m. and 2 p.m. to 3 p.m.

**Q.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?**




***Sol.*** From the graph:

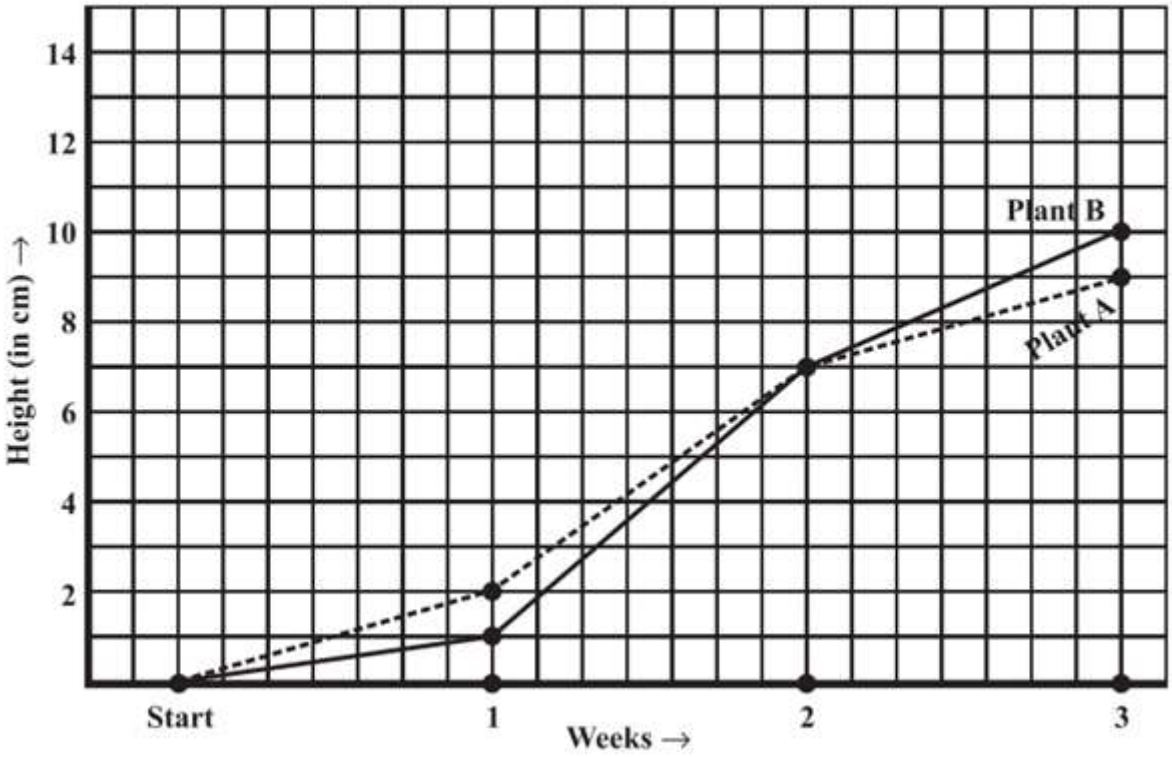
**(a)** (i) The sales in year 2002 were Rs 4 crores.
(ii) And sales in year 2006 were Rs 8 crores.

**(b)** (i) The sales in year 2003 were Rs 7 crores.
(ii) And sales in year 2005 were Rs 10 crores.

**(c)** Since, sales in year 2002 were Rs 4 crores and the sales in year 2006 were Rs Rs 8 crores.
So, the difference in sales between year 2002 and year 2006:
Rs (8 - 4) crores = Rs 4 crores

**(d)** Firstly we need to calculate the difference of the sale between every period of year.
The difference of the sales between the year 2006 and 2005 = Rs (10 - 8) crores = Rs 2 crores
The difference of the sales between the year 2005 and 2004 = Rs (10 - 6) crores = Rs 4 crores.
The difference of the sales between the year 2004 and 2003 = Rs (7 - 6) crores = Rs 1 crore.
The difference of the sales between the year 2003 and 2002 = Rs (7 - 4) crores = Rs 3 crores.
Thus from above calculation, the greatest difference was in the year 2005 as compared to its previous year 2004.

**Q.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.**

***Sol.*** From the graph,

**(a)** (i) After 2 weeks, the height of plant A was 7 cm.
(ii) After 3 weeks, the height of plant A was 9 cm.

**(b)** (i) After 2 weeks the height of plant B was 7 cm.
(ii) After 3 weeks the height of plant B was 10 cm.

**(c)** During 3rd week, growth of plant A = Height of plant A after 3 week - Height of plant A after 2 week
= 9 cm – 7 cm
= 2 cm.

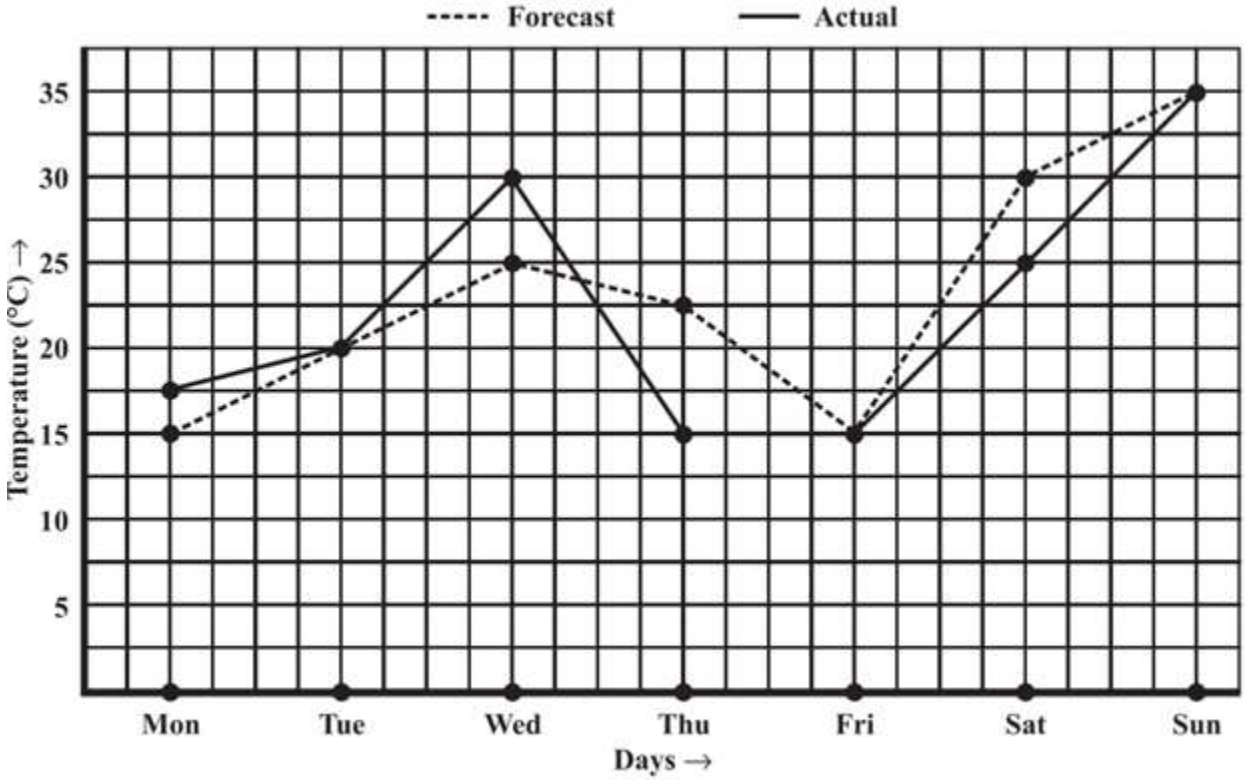
**(d)** The growth of plant B from the end of the 2nd week to the end of the 3rd week
= Height of plant B after 3 week - Height of plant B after 2 week
= 10 cm – 7 cm
= 3 cm

**(e)** Firstly, we need to calculate growth of plant A during every week.
So, growth of plant A during 1st week = 2 cm – 0 cm = 2 cm
The growth of plant A during 2nd week = 7 cm –2 cm = 5 cm
The growth of plant A during 3rd week = 9 cm –7 cm = 2 cm
Thus from above calculation, the growth of plant A was seen most in the 2nd week.

**(f)** Firstly, we need to calculate growth of plant B during every week.
So, growth of plant B during 1st week = 1 cm – 0 cm = 1 cm
The growth of plant B during 2nd week = 7 cm – 1 cm = 6 cm
The growth of plant B during 3rd week = 10 cm – 7 cm = 3 cm
Thus from above calculation, the growth of plant B was seen least growth in the 1st week.

**(g)** From the graph, the height of both the plants A and B were same at the end of 2nd week.

**Q.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?**




***Sol.*** From the graph,
**(a)** Forecast temperatures were the same as the actual temperatures on Tuesday, Friday, and Sunday.

**(b)** The maximum forecast temperature during the week was 35° C on Sunday.

**(c)** The minimum actual temperature during the week was 15° C on Thursday and Friday.

**(d)** Firstly, we need to calculate the difference between the forecast temperature and actual temperature every day.
So, Monday = 17.5 - 15 = 2.5 °C
Tuesday = 20 – 20 = 0 °C
Wednesday = 30 – 25 = 5 °C
Thursday = 22.5-15 = 7.5 °C
Friday = 15 – 15 = 0 °C
Saturday = 30 - 25 = 5 °C
Sunday = 35 – 35 = 0 °C
From above the calculation, On Thursday the actual temperature differ the most from the forecast temperature.

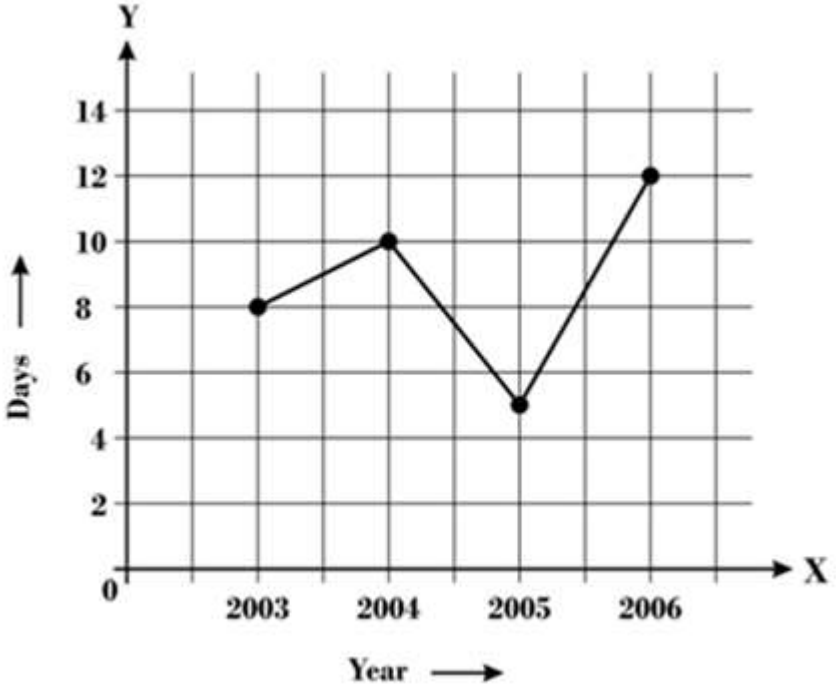
**Q.5 Use the tables below to draw linear graphs.**
**(a) The number of days a hill side city received snow in different years.**

| Year | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| Days | 8 | 10 | 5 | 12 |

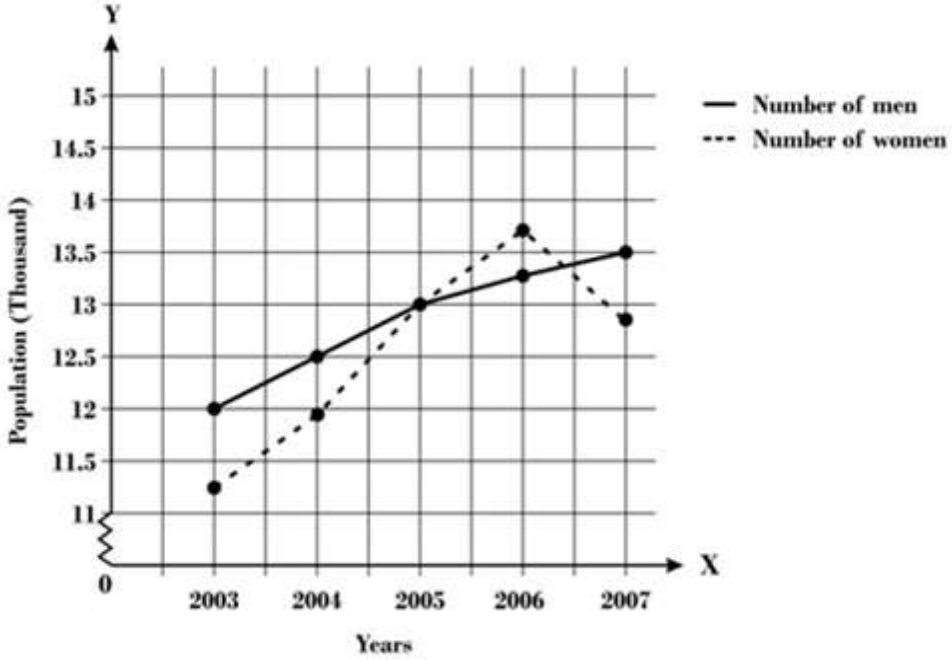
**(b) Population (in thousands) of men and women in a village in different years.**

| Year | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|
| Number of Men | 12 | 12.5 | 13 | 13.2 | 13.5 |
| Number of Women | 11.3 | 11.9 | 13 | 13.6 | 12.8 |

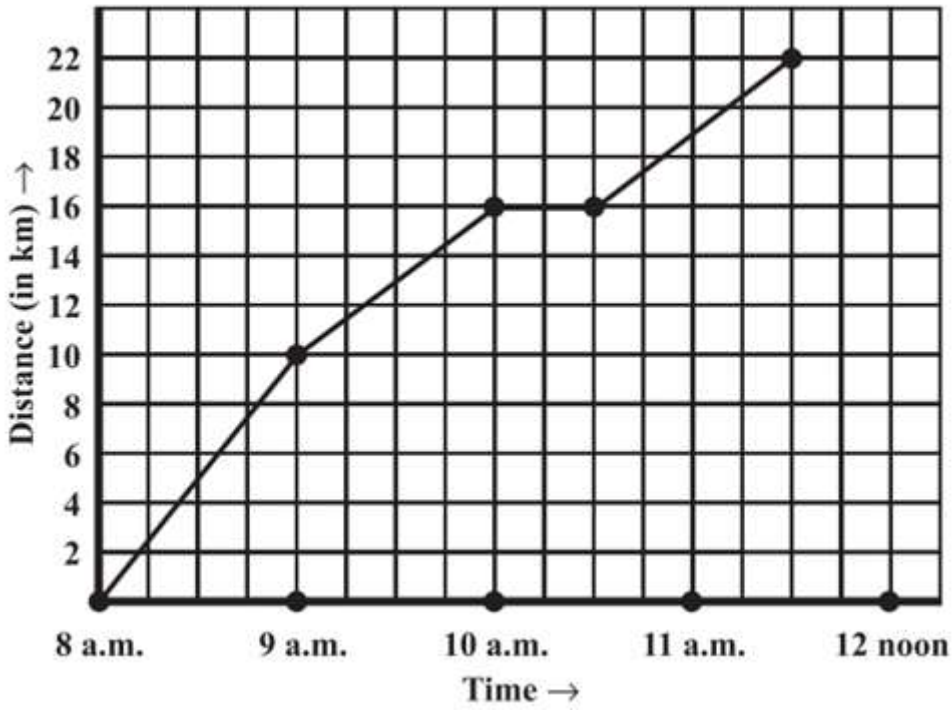
***Sol.*** (a) For graph for given data, x-axis represents the number of years with scale, 2 unit = 1 year, and y-axis represents number of days with scale, 1 unit = 2 days.




(b) For graph for given data, x-axis represents the number of years with scale, 2 unit = 1 year, and y-axis represents population with scale, 1 unit = 0.5 thousand.



**Q.6 A courier-person cycles from a town to a neighbouring 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?**

***Sol.*** From the above graph,
**(a)** The scale taken for time axis, 4 units = 1 hour

**(b)** The person took (12 a.m. -8 a.m.) 4 hours for travelling.

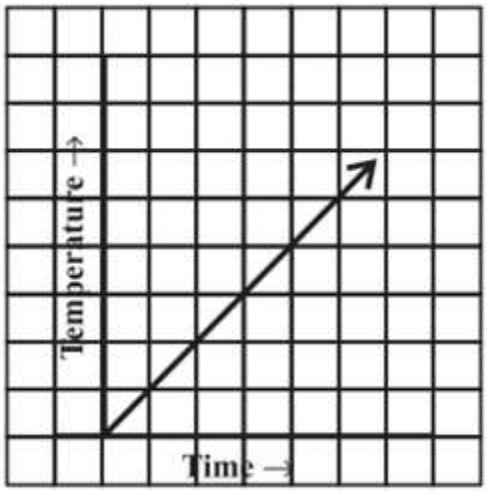
**(c)** The merchant's place is 22 km away from the town.

**(d)** Yes, the person stopped on his way from time 10 a.m. to 10:30 a.m. because in this time duration graph is flat. So, no distance was travelled during this duration.

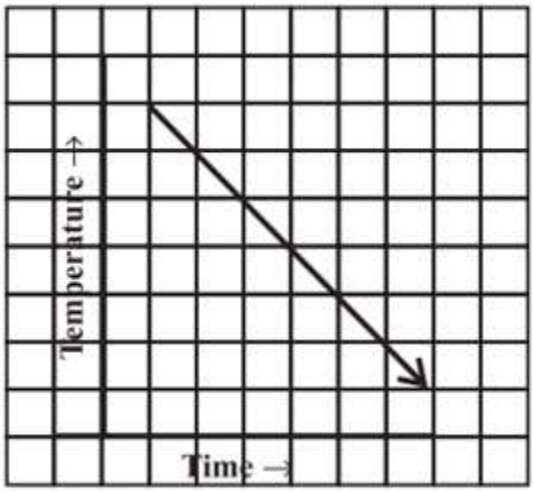
**(e)** The person rode fastest between the time 8 a.m. and 9 a.m. Because in this duration person covered 10 km in 1 hour.

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

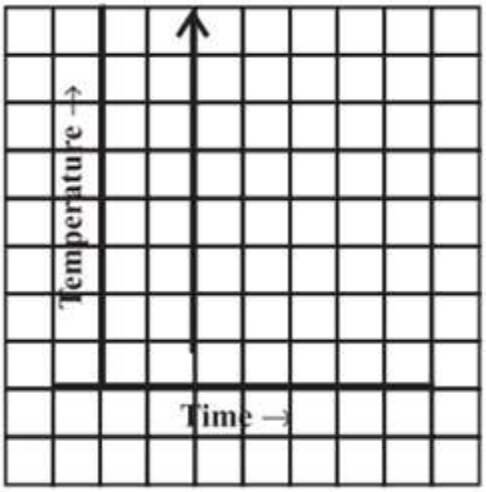
(i)



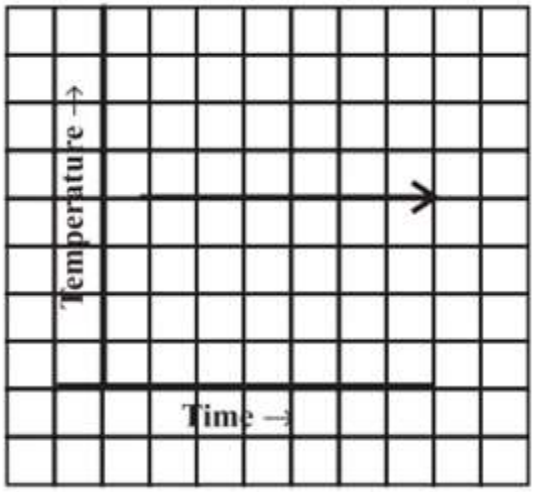

(ii)




(iii)




(iv)




***Sol.*** **(i)** Yes, this graph can be possible.
Since in the graph, the temperature is increasing as the time increases which is possible.
**(ii)** Yes, this graph can be possible.
Since in the graph, the temperature is decreasing as the time decreases which is possible.
**(iii)** No, this graph cannot be possible.
Since in the graph, the temperature is increasing for the same time which is not possible.
**(iv)** Yes, this graph can be possible.
Since in the graph, the temperature is constant at the different time which is possible.