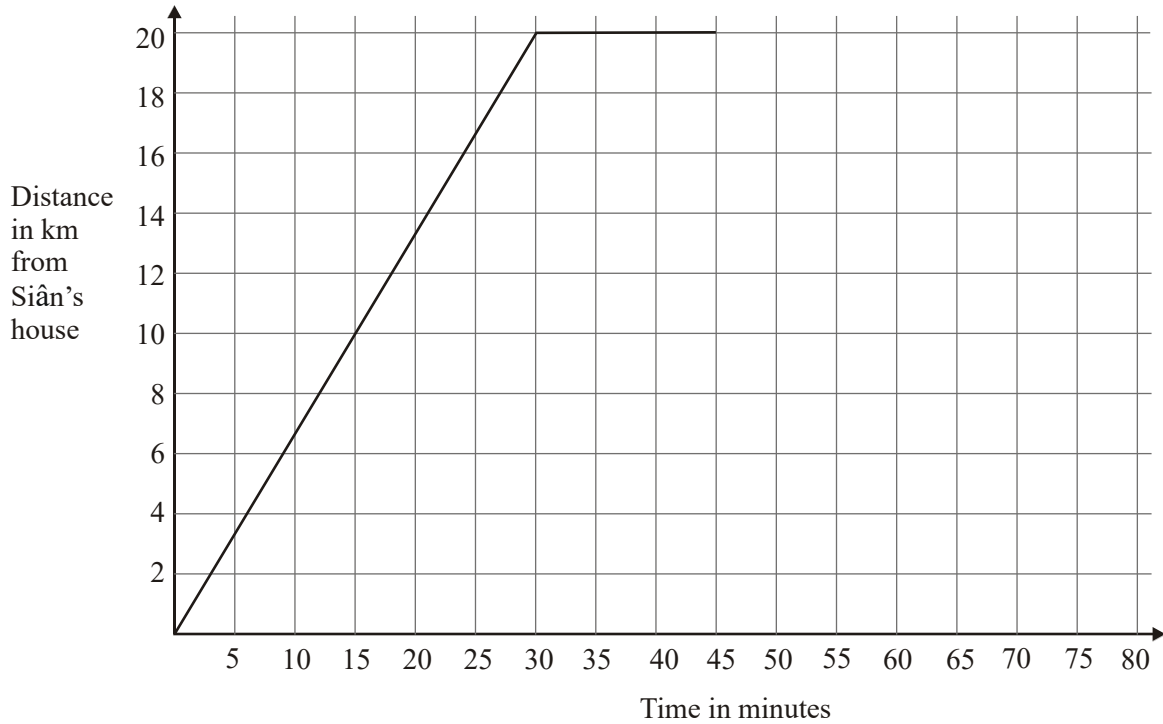


1. Here is part of a travel graph of Siân’s journey from her house to the shops and back.



- (a) Work out Siân’s speed for the first 30 minutes of her journey.
Give your answer in km/h.

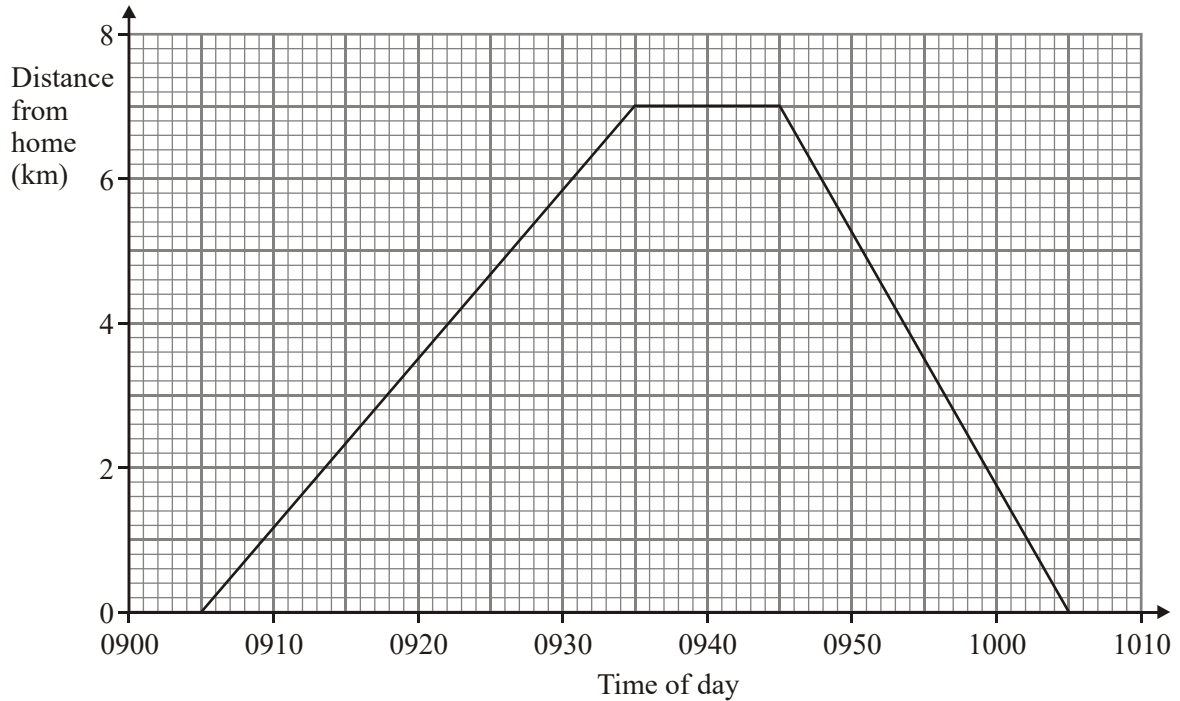
..... km/h (2)

Siân spends 15 minutes at the shops.
She then travels back to her house at 60 km/h.

- (b) Complete the travel graph.

(2)
(Total 4 marks)

2. Anil cycled from his home to the park.
 Anil waited in the park.
 Then he cycled back home.
 Here is a distance-time graph for Anil's complete journey.



(a) At what time did Anil leave home?

..... (1)

(b) What is the distance from Anil's home to the park?

..... km (1)

(c) How many minutes did Anil wait in the park?

..... (1)
 (Total 3 marks)

3. P , Q and R are three stations on a railway line.



$PQ = 26$ miles.

$QR = 4$ miles.

A passenger train leaves P at 12 00. It arrives at Q at 12 30.

Information about the journey from P to Q is shown on the travel graph opposite.

The passenger train stops at Q for 10 minutes.

It then returns to P at the same speed as on the journey from P to Q .

- (a) On the grid, complete the travel graph for this train.

(2)

A goods train leaves R at 12 00.

It arrives at P at 13 00.

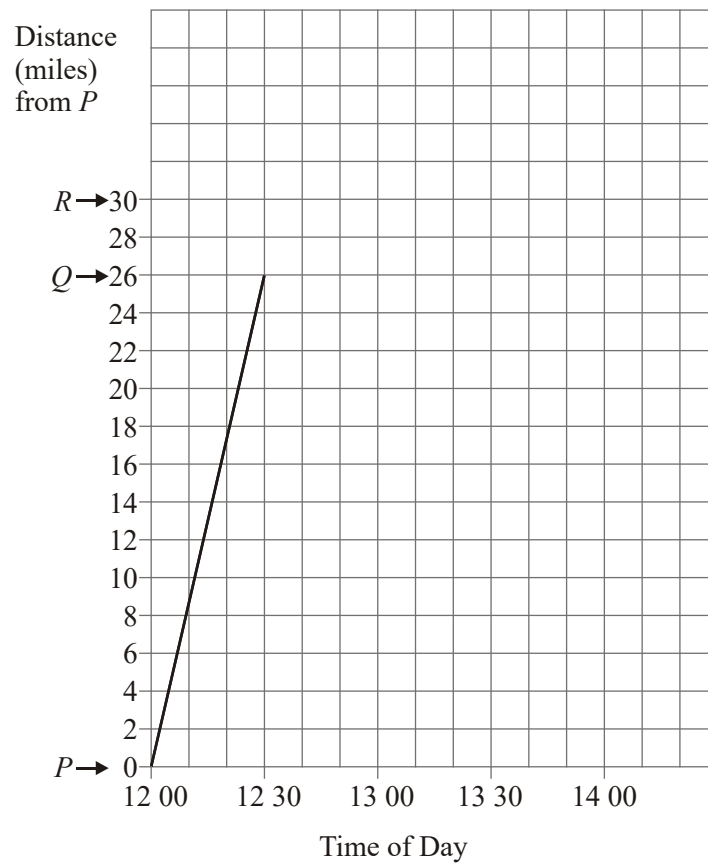
- (b) On the grid, draw the travel graph for the goods train.

(1)

- (c) Write down the distance from P where the goods train passes the passenger train.

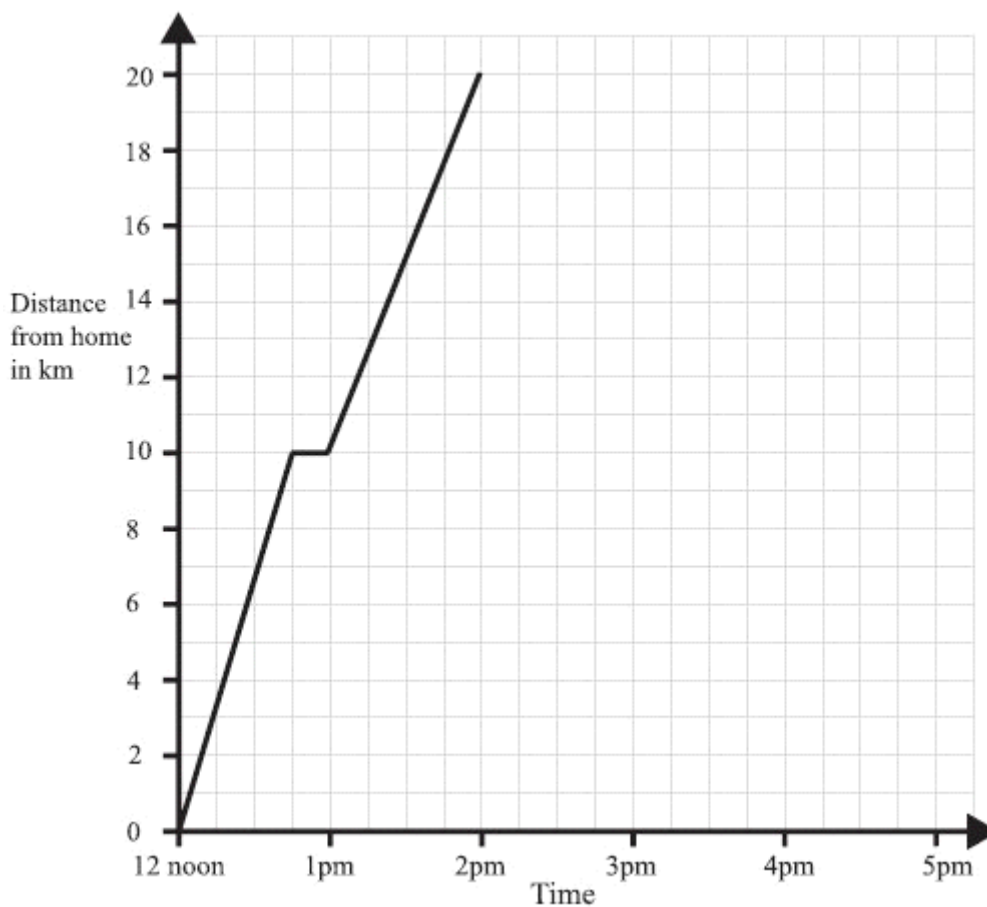
..... miles

(1)



(Total 4 marks)

4. A man left home at 12 noon to go for a cycle ride.
The travel graph represents part of the man's journey.



At 12.45pm the man stopped for a rest.

- (a) For how many minutes did he rest?

.....minutes

(1)

- (b) Find his distance from home at 1.30pm.

.....km

(1)

The man stopped for another rest at 2pm.

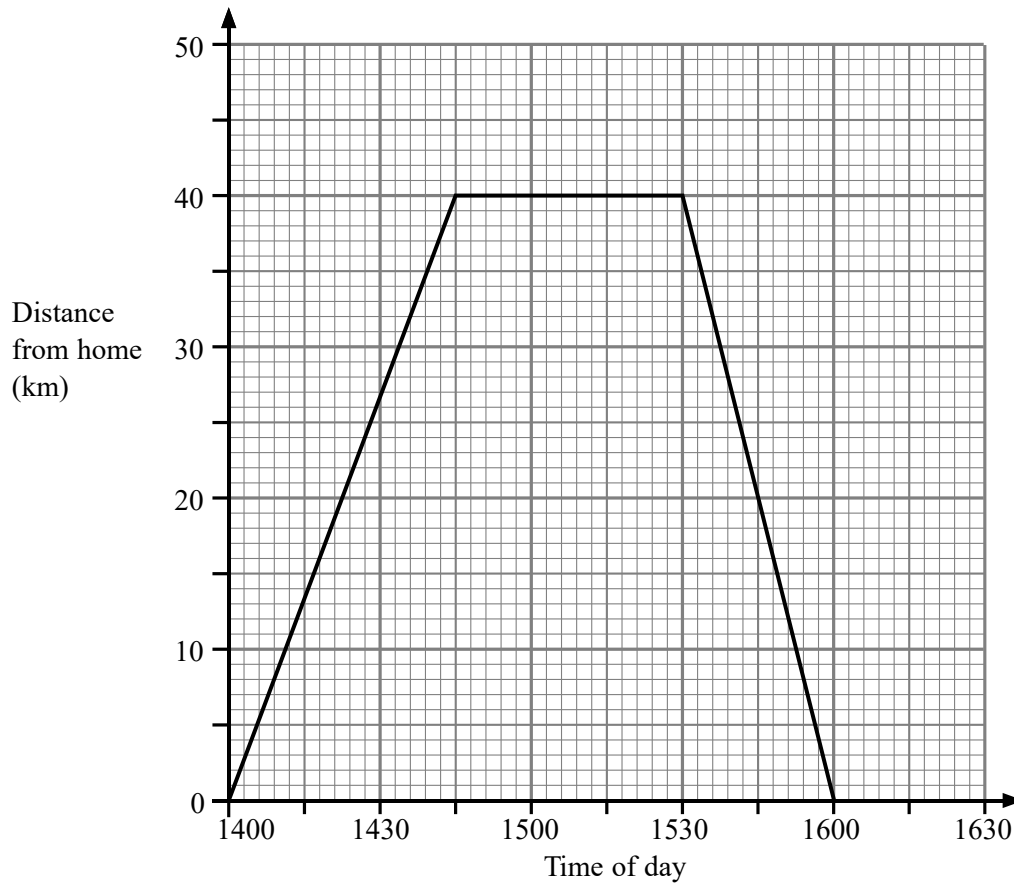
He rested for one hour.

Then he cycled home at a steady speed. It took him 2 hours.

(c) Complete the travel graph.

(2)
(Total 4 marks)

5. Judy drove from her home to the airport.
She waited at the airport.
Then she drove home.
Here is the distance-time graph for Judy's complete journey.



(a) What is the distance from Judy's home to the airport?

..... km

(1)

(b) For how many minutes did Judy wait at the airport?

..... minutes

(1)

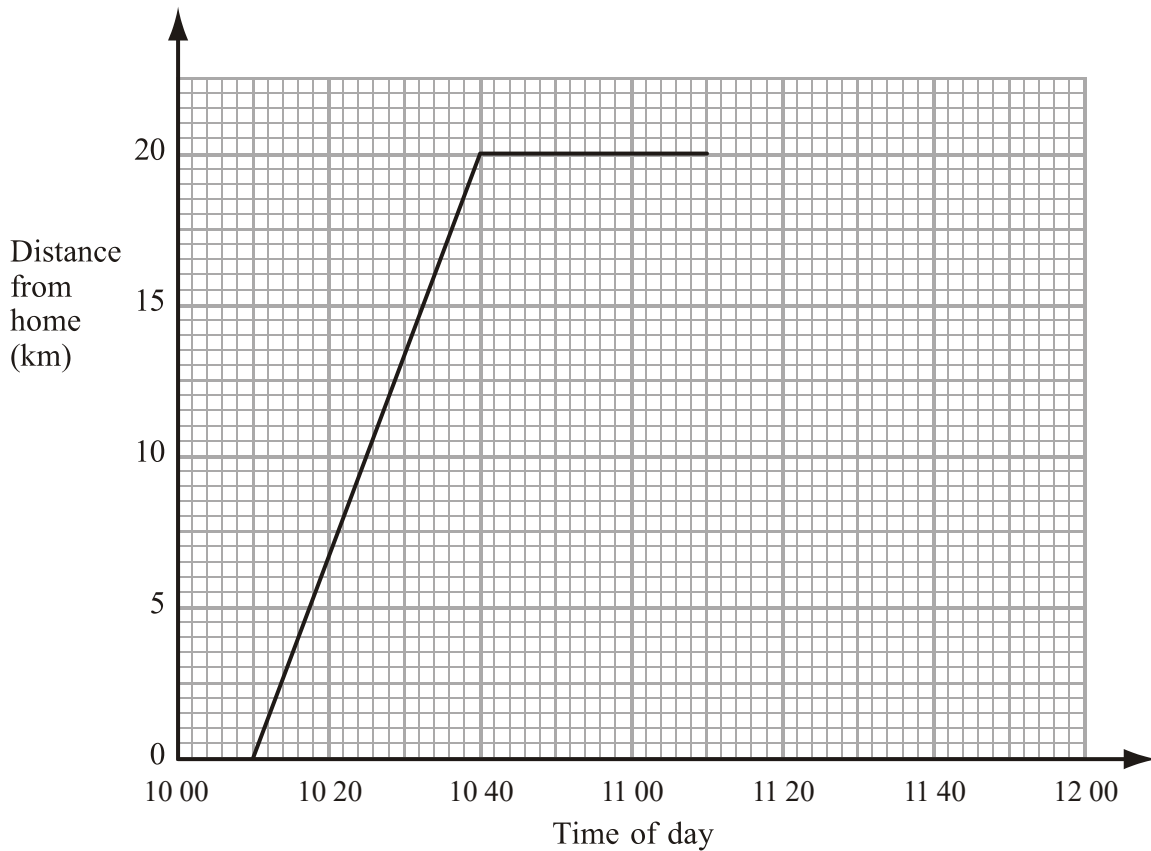
(c) Work out Judy's average speed on her journey home from the airport.
Give your answer in kilometres per hour.

..... kilometres per hour

(2)

(Total 4 marks)

6. Jamie travelled 20 km from his home to his friend's house.
Jamie then spent some time at his friend's house before returning home.
Here is the travel graph for part of Jamie's journey.



- (a) Write down the time that Jamie left home.

.....
(1)

- (b) Write down Jamie's distance from home at 10 20

..... km
(1)

Jamie left his friend's house at 11 10 to return home.

- (c) Work out the time in minutes Jamie spent at his friend's house.

..... minutes
(1)

Jamie returned home at a steady speed.
He arrived home at 11 50

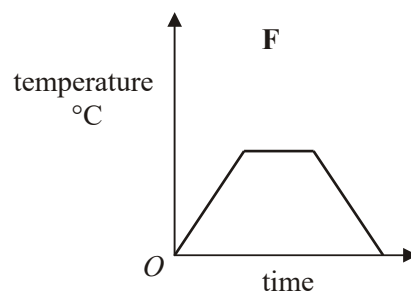
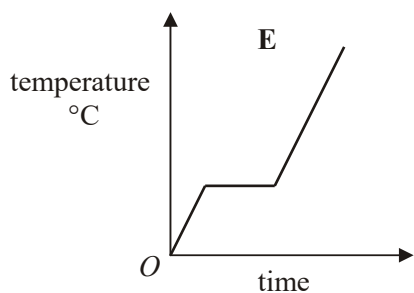
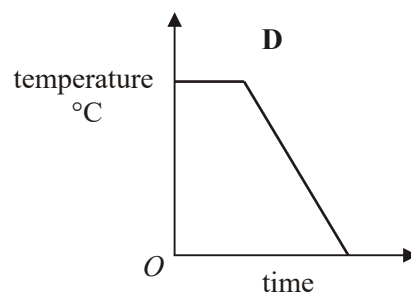
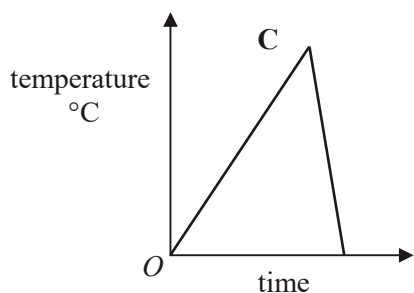
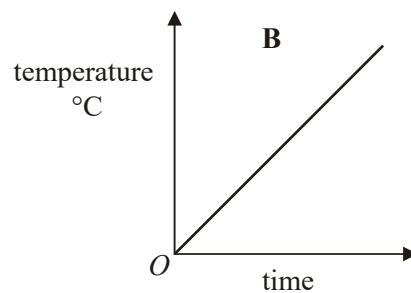
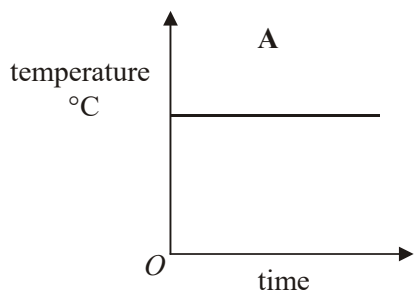
- (d) Complete the travel graph.

(1)

- (e) Work out Jamie's average speed on his journey from his home to his friend's house.
Give your answer in kilometres per hour.

..... kilometres per hour
(2)
(Total 6 marks)

7. Here are six temperature/time graphs.



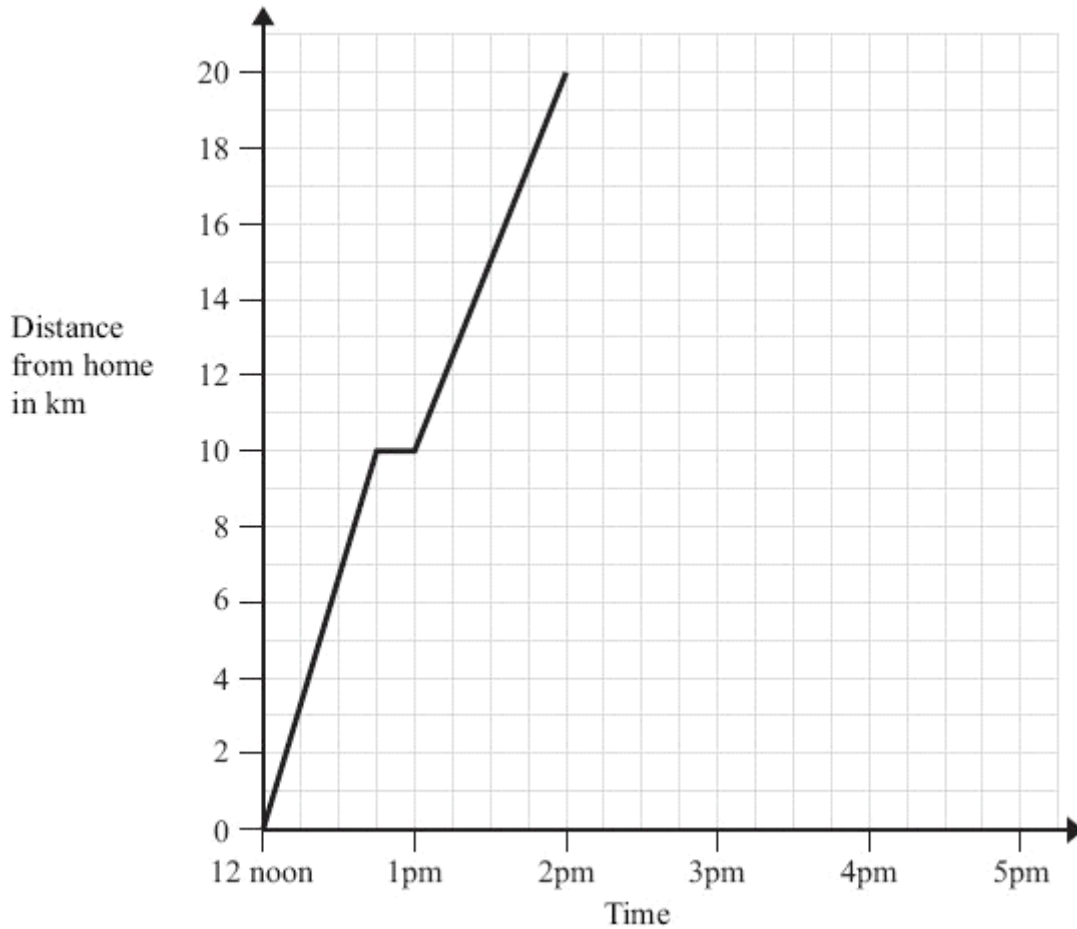
Each sentence in the table describes one of the graphs.
Write the letter of the correct graph next to each sentence.

The first one has been done for you.

The temperature starts at 0°C and keeps rising.	B
The temperature stays the same for a time and then falls.	
The temperature rises and then falls quickly.	
The temperature is always the same.	
The temperature rises, stays the same for a time and then falls.	
The temperature rises, stays the same for a time and then rises again.	

(Total 3 marks)

8. A man left home at 12 noon to go for a cycle ride.
The travel graph represents part of the man's journey.



At 12.45pm the man stopped for a rest.

- (a) For how many minutes did he rest?

..... minutes

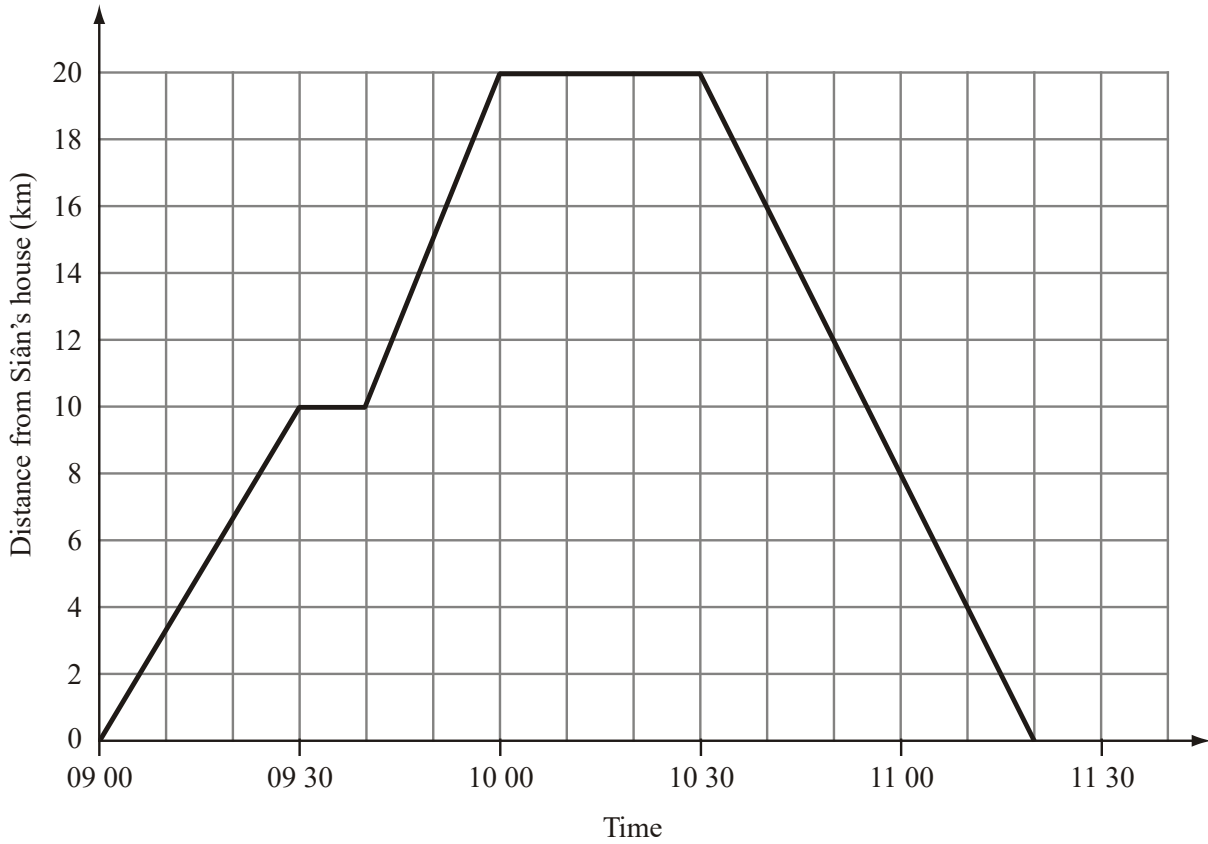
(1)

The man stopped for another rest at 2pm.
He rested for one hour.
Then he cycled home at a steady speed. It took him 2 hours.

- (b) Complete the travel graph.

(2)
(Total 3 marks)

9. Here is a travel graph of Siân's journey from her house to the library and back to her house.



(a) How far is Siân from her house at 09 30?

..... km

(1)

The library is 20 km from Siân's house.

(b) (i) At what time did Siân arrive at the library?

.....

(ii) How long did Siân spend at the library?

..... minutes

(2)

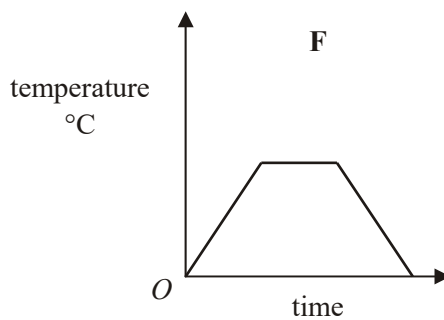
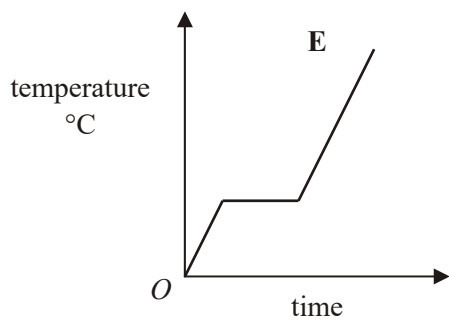
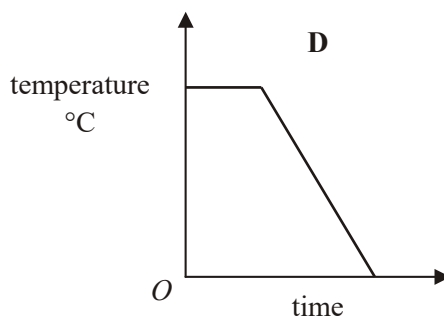
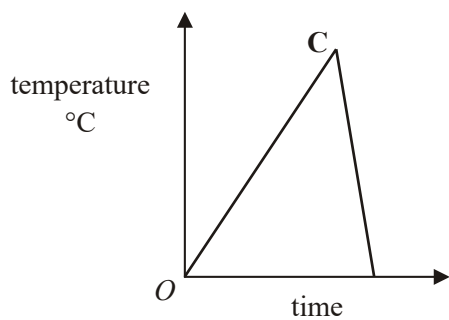
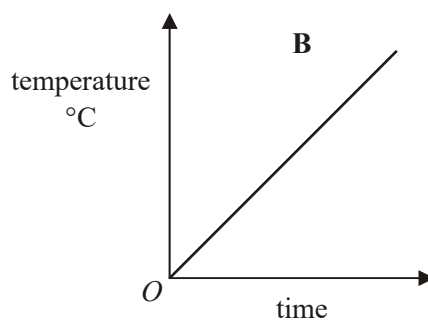
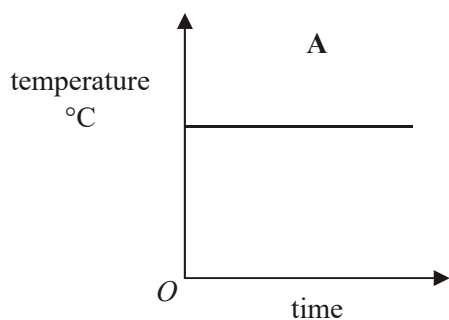
Siân left the library at 10 30 to travel back to her house.

(c) At what time did Siân arrive back at her house?

.....

(1)
(Total 4 marks)

10. Here are six temperature/time graphs.



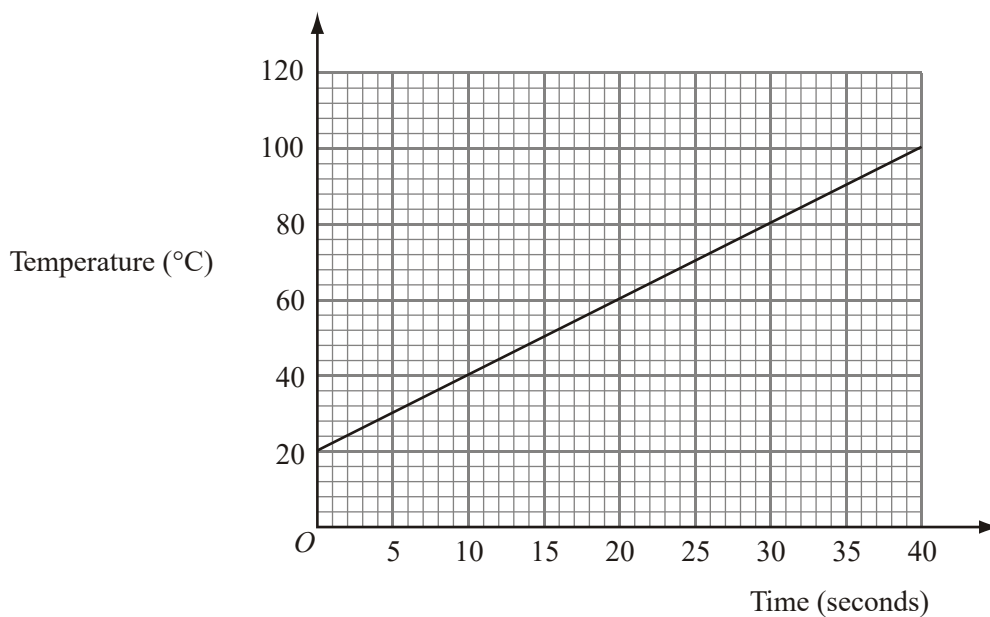
Each sentence in the table describes one of the graphs.
Write the letter of the correct graph next to each sentence.

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The temperature is always the same.	
The temperature rises, stays the same for a time and then falls.	
The temperature rises, stays the same for a time and then rises again.	

(Total 3 marks)

11. Joe heats some water in a kettle.
The graph gives information about the temperature of the water in the kettle and the length of time it has been heated.



- (a) Write down the temperature of the water when Joe started to heat the water.

..... °C (1)

- (b) Use the graph to find how many seconds it took the water to reach a temperature of 70°C.

..... seconds (1)

- (c) Work out the increase in the temperature of the water from the 10th second to the 35th second.

..... °C (2)
(Total 4 marks)

1. (a) 40 2

$$20 \times 2 \text{ or } \frac{20}{30} \times 60 \text{ or } 20 \div \frac{1}{2}$$

$$MI \text{ for } 20 \times 2 \text{ or } \frac{20}{30} \times 60 \text{ or } 20 \div \frac{1}{2}$$

Al cao

- (b) line from (45, 20) to (65, 0) 2
- $\frac{20}{60}$ or $\frac{1}{3}$ or 20 minutes
- M1 for $\frac{20}{60}$ or $\frac{1}{3}$ or 20 minutes seen*
- A1 for correct line*
- SC If M0, B1 for line from (45, 20) to (t, 0) where $t > 4$*
or B1 for a line of the correct gradient.
- [4]**
2. (a) 09 05 1
- B1 for 09 05 oe*
- (b) 7 1
- B1 for 7*
- (c) 10 1
- B1 for 10*
- [3]**
3. (a) Graph completed 2
- B2 cao tol $\pm 1mm$*
(B1 if either section correct)
- (b) Line drawn 1
- B1 cao tol $\pm 1mm$*
- (c) (19) 1
- B1 ft from graph – at any intersection between a line segment of negative gradient and a line associated with the passenger train*
- [4]**
4. (a) 15 1
- B1 for 15 (± 1)*
- (b) 15 1
- B1 for 15 (± 0.4)*

- (c) 2
B1 horiz. line from (2, 20) to (3, 20)
B1 line from (3, 20) to (5, 0) or horizontal translation of it
SC B1 for any journey ending at (5, 0) [4]
5. (a) 40 1
B1cao
- (b) 45 1
B1 for 42 – 48 accept 3/4 hour
- (c) 40×2 or $\frac{40}{30} \times 60$ or $40 \div \frac{1}{2}$ 2
 = 80
M1 for 40×2 or $\frac{40}{30}$ or $40 \div \frac{1}{2}$
A1 cao
NB $\frac{40}{45} \times 60$ gets M0 A0 [4]
6. (a) 1010 1
B1 (accept 10.10am, 10.10pm, ten past ten etc)
- (b) 6.0 to 7.5 exclusive 1
B1 for 6.0 to 7.5 exclusive
- (c) 30 1
B1 cao
- (d) graph 1
B1 cao Line from (11.10, 20) to (11.50, 0) ($\pm 2mm$)
Accept freehand line if intention is clear
- (e) 40 2
M1 $20 \div 30$ or $20 \div 0.5$ oe or 0.6 or 0.66.....
A1 cao
SC B1 for $20 \div 40$ in working or 0.5 or 30 given as answer. [6]

7. (B), D, C, A, F, E 3
B3 all correct
(B2 for 3 or 4 correct
B1 for 1 or 2 correct) [3]
8. (a) 15 1
B1 cao for 15(± 1)
- (b) 2
B1 horiz. line from (2, 20) to (3, 20)
B1 line from (3, 20) to (5, 0) or horiz. translation of it
SC: B1 for any journey ending at (5, 0) [3]
9. (a) 10 1
B1 cao
- (b) (i) 10 00 2
B1 accept 10 or 10 o'clock (ignore am or pm)
- (ii) 30
B1 cao
- (c) 11 20 1
B1 [4]
10. (B), D, C, A, F, E 3
B3 all correct
(B2 for 3 or 4 correct) (B1 for 1 or 2 correct) [3]
11. (a) 20 1
B1 cao
- (b) 25 1
B1 accept answer in range $24 \leq t \leq 26$

(c) 90-40
50

2

*M1 picks 10th and 35th seconds $ft \pm 1$ square, can be implied by sight of 90 ± 2 or 40 ± 2 , or marks on the graph at (10, 40) and (35, 90)
A1 (48 to 52 inclusive)*

[4]

1. Mathematics A

Paper 1

The answer 20, read directly from the travel graph, appeared much more often than the correct answer in part (a). In part (b), both marks were occasionally awarded but many candidates scored one mark for a line from (45, 20) to the time axis, often (60, 0) or for a line of the correct gradient, usually from (60, 20) to (80, 0).

Paper 3

In part (a) the conversion to km/h was beyond most candidates, with many merely multiplying 20 by 30. This resulted in some answers given as 600km/h or 60km/h. Few candidates related 30 minutes to 0.5 hour in order to perform the correct calculation. In part (b) most candidates realised that their line had to arrive back on the horizontal axis, but only a minority attempted to calculate the necessary gradient.

Mathematics B

Paper 14

20 was the most common answer seen in (a). Very little working was evident in (b). Not many candidates scored the full two marks but many did realise that the graph had to return to the time axis, often ending incorrectly at (60, 0).

Paper 16

Part (a) was poorly done by all levels of ability. The different units of time were ignored and knowledge of speed calculation was wasted. $\frac{20}{30} = 0.66$ and 1.5 was often seen together with methods giving $\frac{30}{20}$ and 30×20 .

Part (b) gained greater success and many candidates scored at least 1 mark, usually for a straight line from (45, 20) to the time axis. It was very unusual here to see any working out of the length of the return journey.

2. Mathematics A**Paper 1**

Over 80% of candidates were able to complete the first two parts of this question correctly and 67% were able to give the correct response to part (c).

Paper 3

Parts (a), (b) and (c) were answered very well with most candidates interpreting the distance-time graph correctly and gaining all three marks.

Mathematics B Paper 14

There were good attempts at parts (a) and (b) with over 85% getting both marks. Two thirds of the candidates were able to correctly work out how long Anil waited in the park.

3. Nearly $\frac{3}{4}$ of candidates gained full marks in each part of this question. This is a significant improvement on previous attempts at travel graph questions. In part (a) some candidates omitted the stop, whilst some continued upwards to R. In part (b) some candidates incorrectly assumed that both trains arrived at P at the same time.

4. Specification A**Foundation Tier**

This question was well understood by all candidates at this tier. Part (a) and (b) were answered correctly by about 70% of candidates. In part (c) 75% of candidates gained at least one mark for this part of the question with two marks being obtained by 45% of candidates for completing one stage on the graph correctly.

Intermediate Tier

The first two parts of this question were answered extremely well. In part (c) more than 70% of candidates completed the travel graph correctly and most gained at least one mark. The most common error was for the final stage of the journey to finish at 5.15pm rather than at 5pm.

Specification B

The first two parts of this question involved interpreting information from a travel graph. Once the scale on the axes had been evaluated it was a relatively easy task and there were many correct results. Completing the travel graph by using the additional information produced a range of responses. Representing a period of rest as a horizontal straight line of length four squares was generally fine but the journey back home at a steady speed for two hours often lacked an acceptable degree of accuracy. Just over 40% were able to gain the full marks for part (c). It was surprising to see how many candidates went off the top of the grid by drawing a horizontal line at 20 km and then going upwards.

5. Foundation Tier

Part (a) was well answered with almost all candidates being able to read off the distance. Candidates were less successful in interpreting the time scale and 15 minutes was seen infrequently. In part (c), the most common answer was '20' which appeared to come from '40 in half an hour, therefore 20 in one hour'. Very few candidates obtained the correct result to this question and often failed to gain any credit for working as none was shown.

Intermediate Tier

Part (a) was answered very well indeed. Slightly fewer candidates were successful in part (b) with some errors appearing to result from the scale being misread. The seemingly straightforward question in part (c) caused a lot of difficulties. Some of the better candidates gave the answer of 80km/h with little or no working shown but there was a significant number who made mistakes in their attempts. The most common approach to find the speed was to divide 40 km by 30 (minutes). Many then failed to multiply by 60 and answers in the region of 1.3 were frequently seen. Those who converted the time into hours and wrote $40 \div 2$ often gave the answer as 20 km/h but at least gained the method mark. It is a pity that answers of 20 were often seen without any working, preventing the examiner from awarding any marks.

6. Foundation Tier

Most answers to this question, including those from the weaker candidates, were awarded some credit. Nearly all candidates could write down the time that Jamie left home (part (a)) and most could work out the time he spent at his friend's house (part(c)). A sizeable proportion of candidates could also complete the travel graph correctly. However the scale used on the distance axis was not usually interpreted correctly and the incorrect answer "5.3" was commonly seen in part (b). It was rare to see correct answers or any evidence of a correct method in part (e) – the calculation of an average speed. The incorrect answers "20" and "30" were often seen.

Intermediate Tier

Parts (a) to (d) were well answered. In part (e) many candidates recognised that they had to use distance \div time, but the weaker candidates could not relate the figures to distance and time, typically writing figures like $20 \div 11.52$. Units also presented problems.

7. Foundation

This question was very well answered leading to 92% of candidates being awarded full marks.

Higher

This was very well answered indeed and very few candidates failed to correctly identify each chart.

8. The majority of candidates in part (b) understood the concept of a rest period equating to a zero gradient and read the time scale accurately to gain the mark for this part of the resulting journey. Usually candidates completed the graph correctly, terminating at 5 pm; however a significant number used the end of the grid (5:15pm) as their end point. Some thought the return journey was still a positive gradient and a line segment joining (3, 20) to (5, 21) was not uncommon. Those who failed to accurately show the 1 hour rest period on the graph often still showed that the journey finished at 5 pm and thus were awarded one mark.

9. The travel graph of a journey was generally well interpreted allowing all four parts of the question to be attempted. Over 70% of the candidates scored all 3 marks for parts (a) and (b). The final part proved to be the most demanding as this required an understanding of the scale being used on the horizontal axis with a correct time of 11:20. The addition of either 'am' or 'pm' was acceptable. Many wrote 11 10 or 11 15 with 79% writing the correct answer of 11 20.

10. This question was done extremely well.

11. Candidates knew what they had to do with this question and could read the time axis accurately as there was a one to one correspondence between the squares and the numbers. They struggled with reading the intermediate points on the vertical scale where one 2 mm square was 4°C. Only 2% of candidates scored no marks whilst 8% scored 1 mark usually for reading off the 20° in part (a). A further 22% scores 2 marks, usually for obtaining correct responses to parts (a) and (b) whilst fully correct responses to all parts were obtained by only 45% of candidates. One mark was awarded in (c) for candidates that marked the required points on the graph or correctly read off the values of 40 or 90.