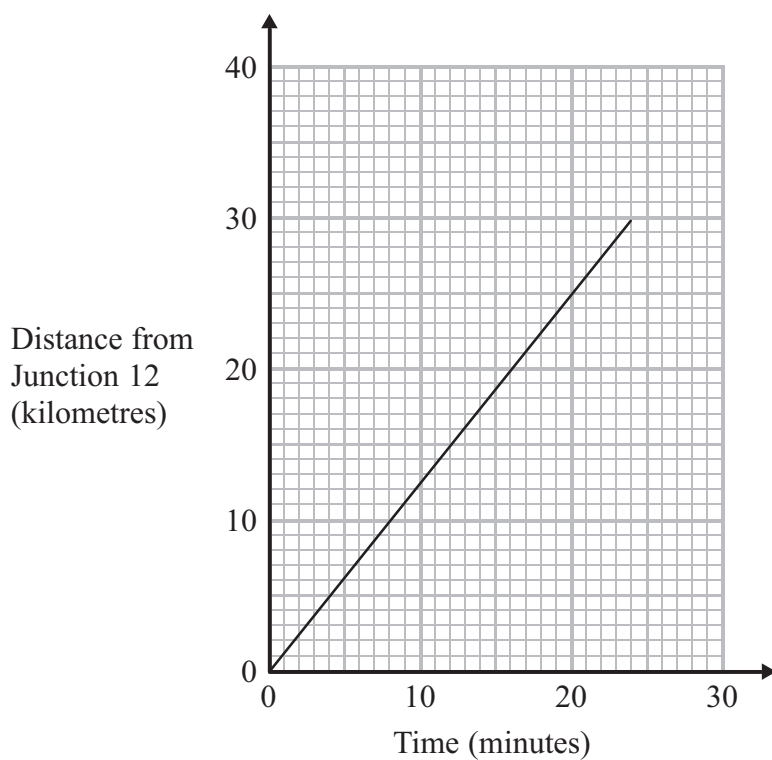


1 Debbie drove from Junction 12 to Junction 13 on a motorway.

The travel graph shows Debbie's journey.



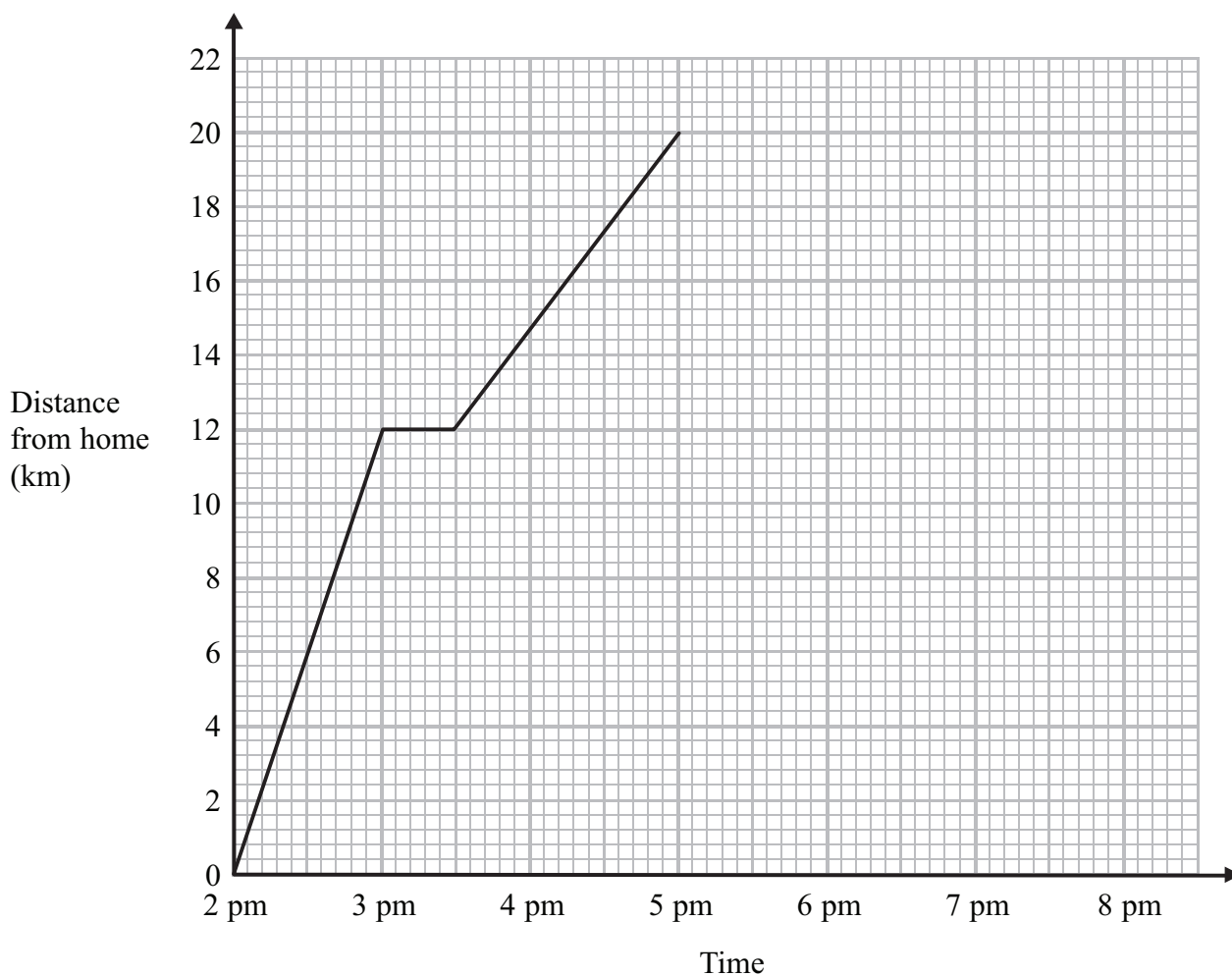
Ian also drove from Junction 12 to Junction 13 on the same motorway.
He drove at an average speed of 66 km/hour.

Who had the faster average speed, Debbie or Ian?
You must explain your answer.

(Total for Question 1 is 4 marks)

- 2 Simon went for a cycle ride.
He left home at 2 pm.

The travel graph represents part of Simon's cycle ride.



At 3 pm Simon stopped for a rest.

- (a) How many minutes did he rest?

..... minutes
(1)

- (b) How far was Simon from home at 5 pm?

..... km
(1)

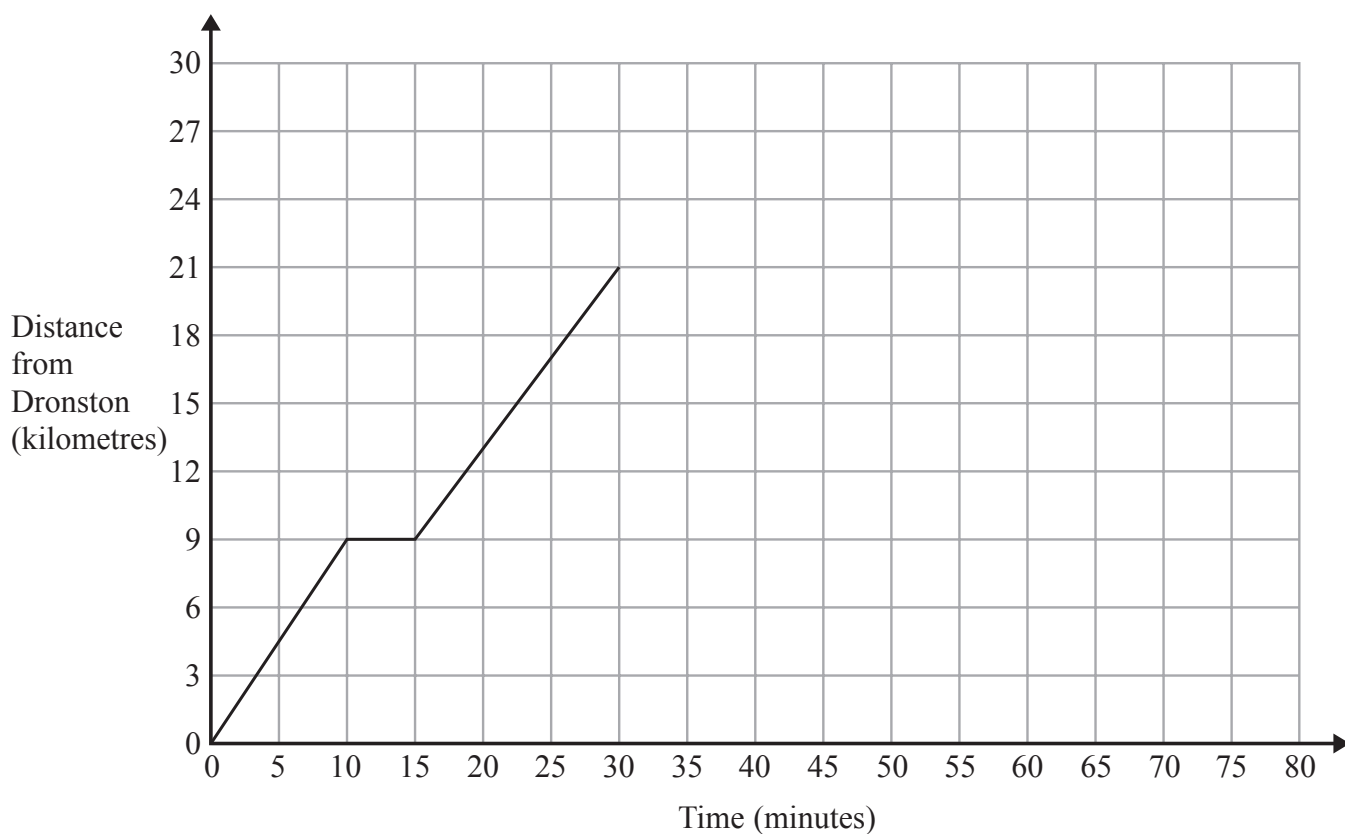
At 5 pm Simon stopped for 30 minutes.
Then he cycled home at a steady speed.
It took him 1 hour 30 minutes to get home.

- (c) Complete the travel graph.

(2)

(Total for Question 2 is 4 marks)

- 3 A coach travels from Dronston to Luscoe.
The travel graph for this journey is shown below.



- (a) Work out the average speed of the coach, in kilometres per hour, for the first 10 minutes of the journey.

..... km/h
(2)

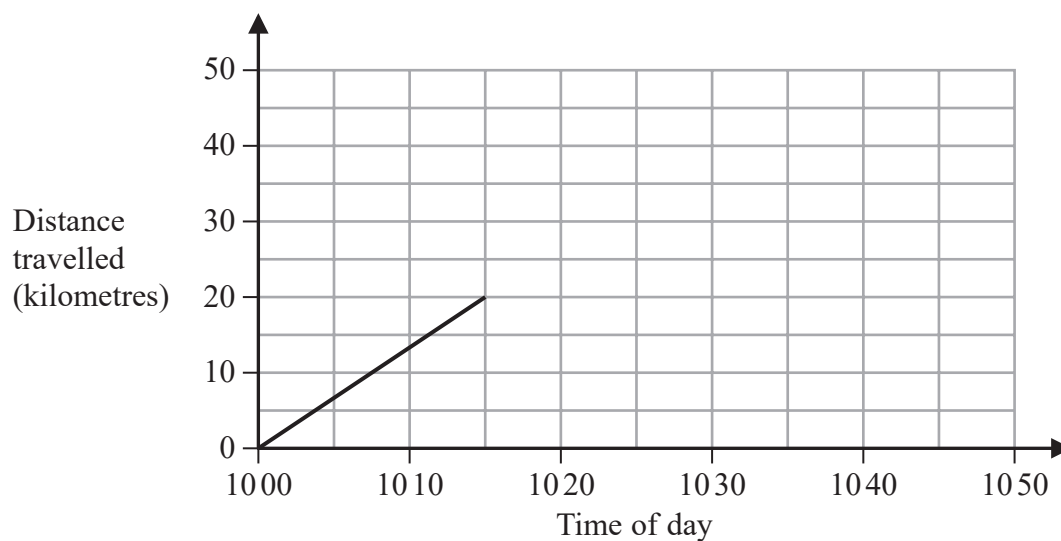
The coach stops in Luscoe for 15 minutes.
The coach then returns to Dronston at a constant speed of 42 km/h.

- (b) Show this information on the travel graph.

(3)

(Total for Question 3 is 5 marks)

- 4 Sam drives his car on a journey.
Here is the travel graph for the first 15 minutes of his journey.



- (a) Work out Sam's speed, in km/h, for the first 15 minutes of his journey.

..... km/h
(2)

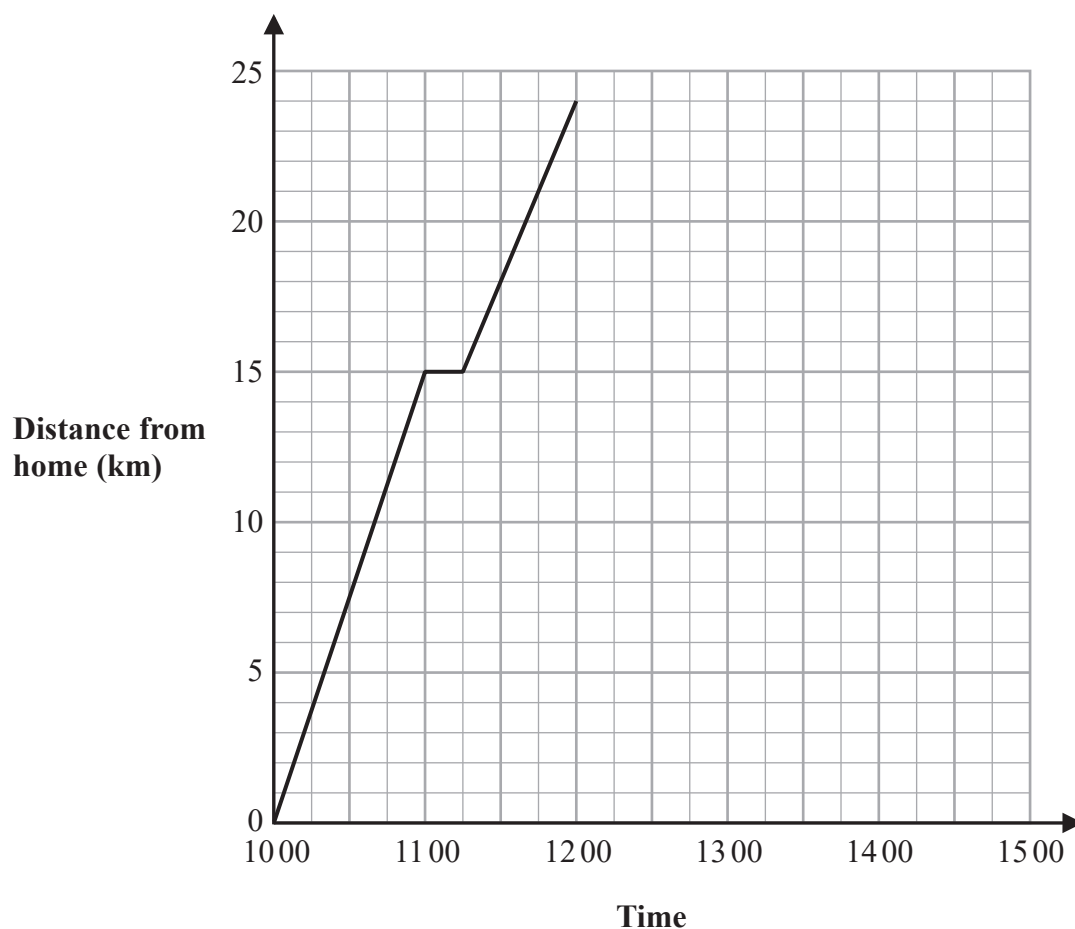
At 10 15 Sam stops for 10 minutes and then drives for 20 minutes at a speed of 75 km/h.

- (b) On the grid, complete the travel graph for Sam's journey.

(3)

(Total for Question 4 is 5 marks)

- 5 Jalina left her home at 10 00 to cycle to a park.
On her way to the park, she stopped at a friend's house and then continued her journey to the park.
Here is the distance-time graph for her journey to the park.



- (a) On her journey to the park, did Jalina cycle at a faster speed before or after she stopped at her friend's house?
Give a reason for your answer.

(1)

Jalina stayed at the park for 45 minutes.

She then cycled, without stopping, at a constant speed of 16 km/h from the park back to her home.

(b) Show all this information on the distance-time graph.

(2)

(c) Work out Jalina's average cycling speed, in kilometres per hour, for the complete journey to the park and back.

Do **not** include the times when she was not cycling in your calculation.

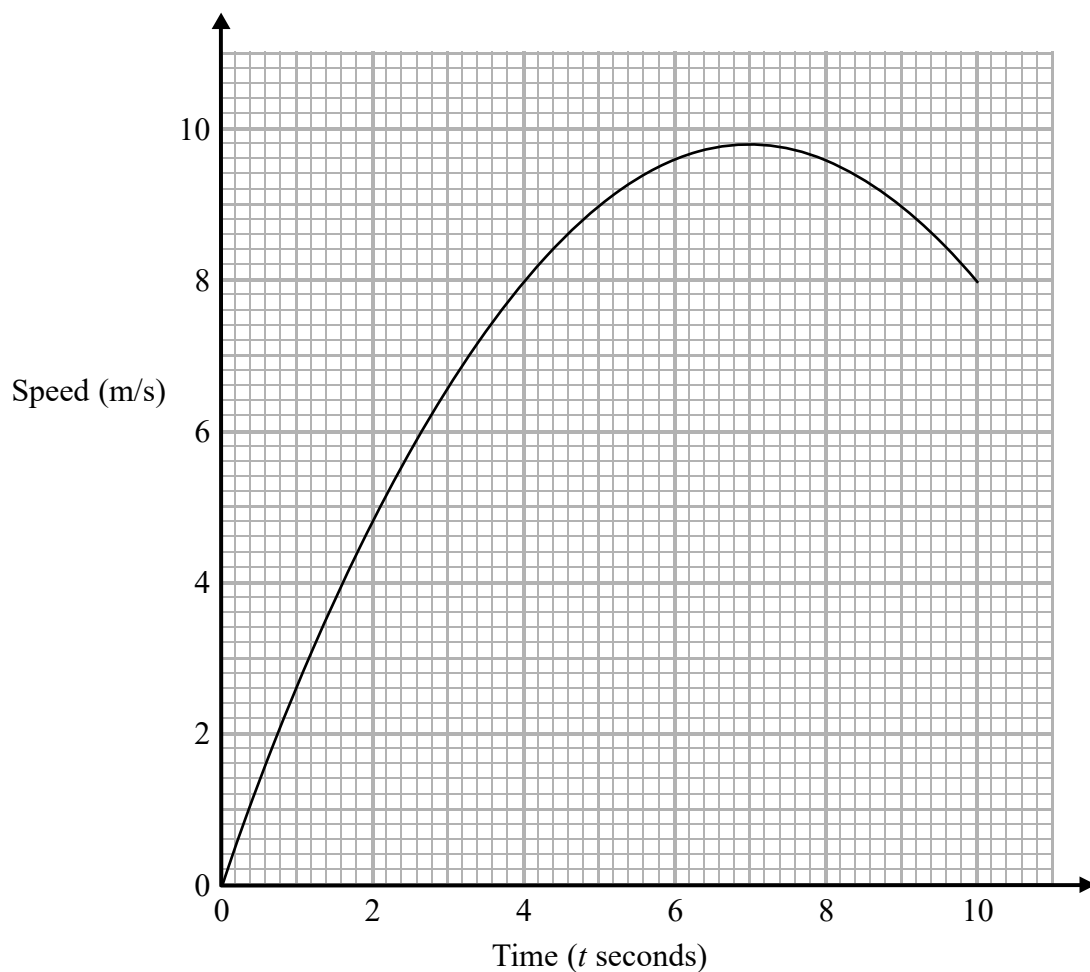
Give your answer correct to 1 decimal place.

..... km/h
(3)

(Total for Question 5 is 6 marks)

6 Karol runs in a race.

The graph shows her speed, in metres per second, t seconds after the start of the race.



- (a) Calculate an estimate for the gradient of the graph when $t = 4$
You must show how you get your answer.

(b) Describe fully what your answer to part (a) represents.

.....

.....

(2)

(c) Explain why your answer to part (a) is only an estimate.

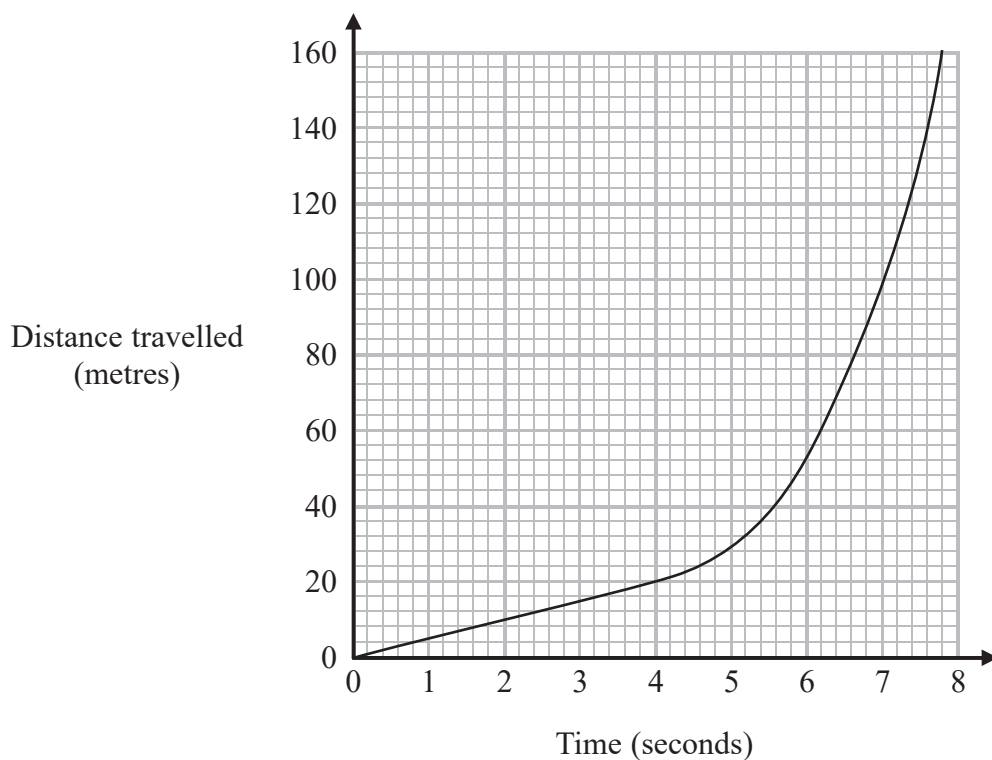
.....

.....

(1)

(Total for Question 6 is 6 marks)

7 The distance-time graph shows information about part of a car journey.

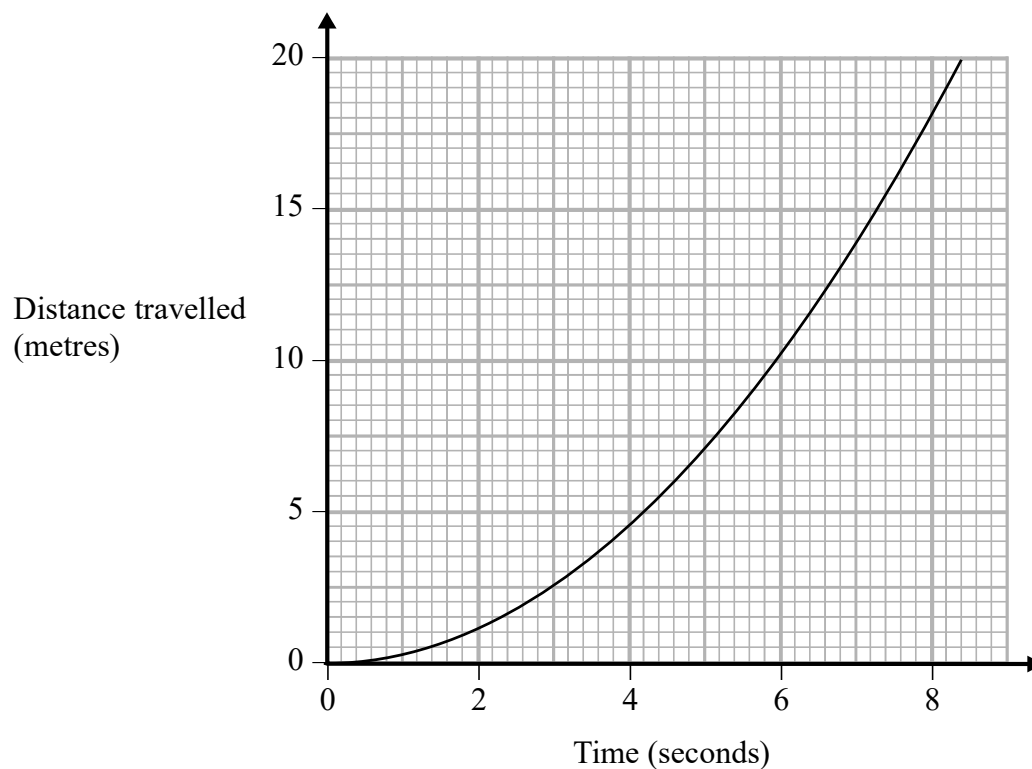


Use the graph to estimate the speed of the car at time 5 seconds.

..... m/s

(Total for Question 7 is 3 marks)

8 The graph shows information about part of a cyclist's journey.

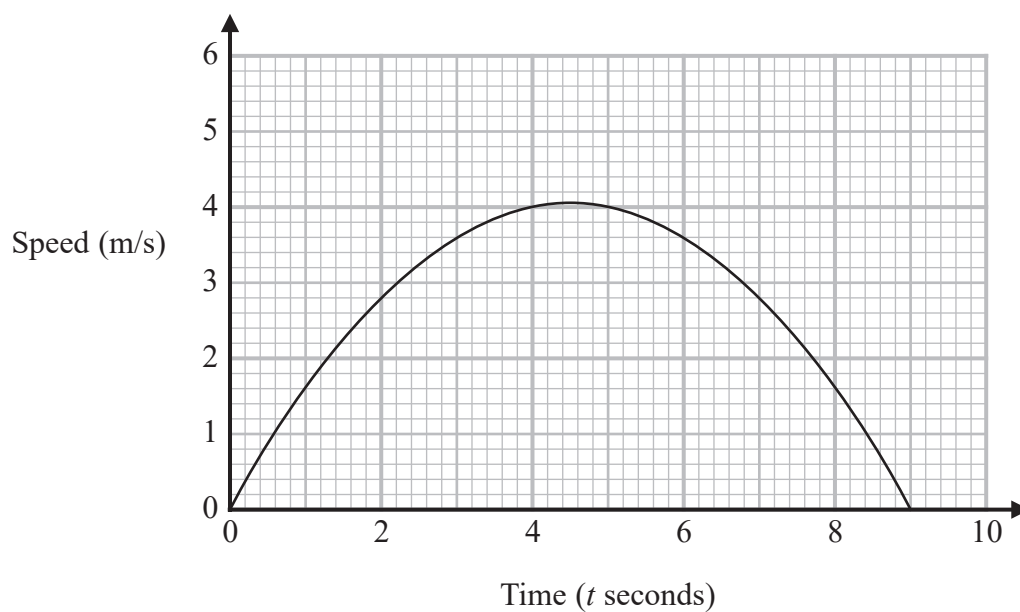


Work out an estimate of the speed, in m/s, of the cyclist at time 6 seconds.

..... m/s

(Total for Question 8 is 3 marks)

9 Here is a speed-time graph.



(a) Work out an estimate of the gradient of the graph at $t = 2$

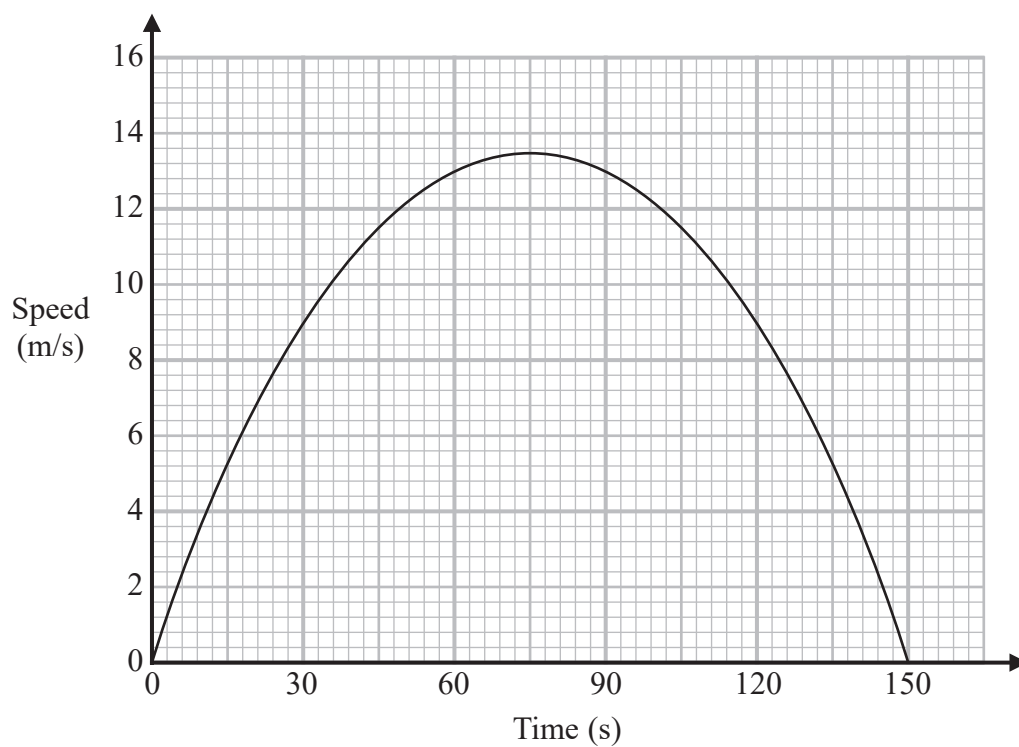
.....
(3)

(b) What does the area under the graph represent?

.....
.....
(1)

(Total for Question 9 is 4 marks)

10 Here is a speed-time graph for a car.



(a) Work out an estimate for the distance the car travelled in the first 30 seconds.

..... m
(2)

(b) Is your answer to part (a) an underestimate or an overestimate of the actual distance the car travelled in the first 30 seconds?
Give a reason for your answer.

.....
.....
.....
(1)

Julian used the graph to answer this question.

Work out an estimate for the acceleration of the car at time 60 seconds.

Here is Julian's working.

$$\text{acceleration} = \text{speed} \div \text{time}$$

$$= 13 \div 60$$

$$= 0.21\dot{6} \text{ m/s}^2$$

Julian's method does not give a good estimate of the acceleration at time 60 seconds.

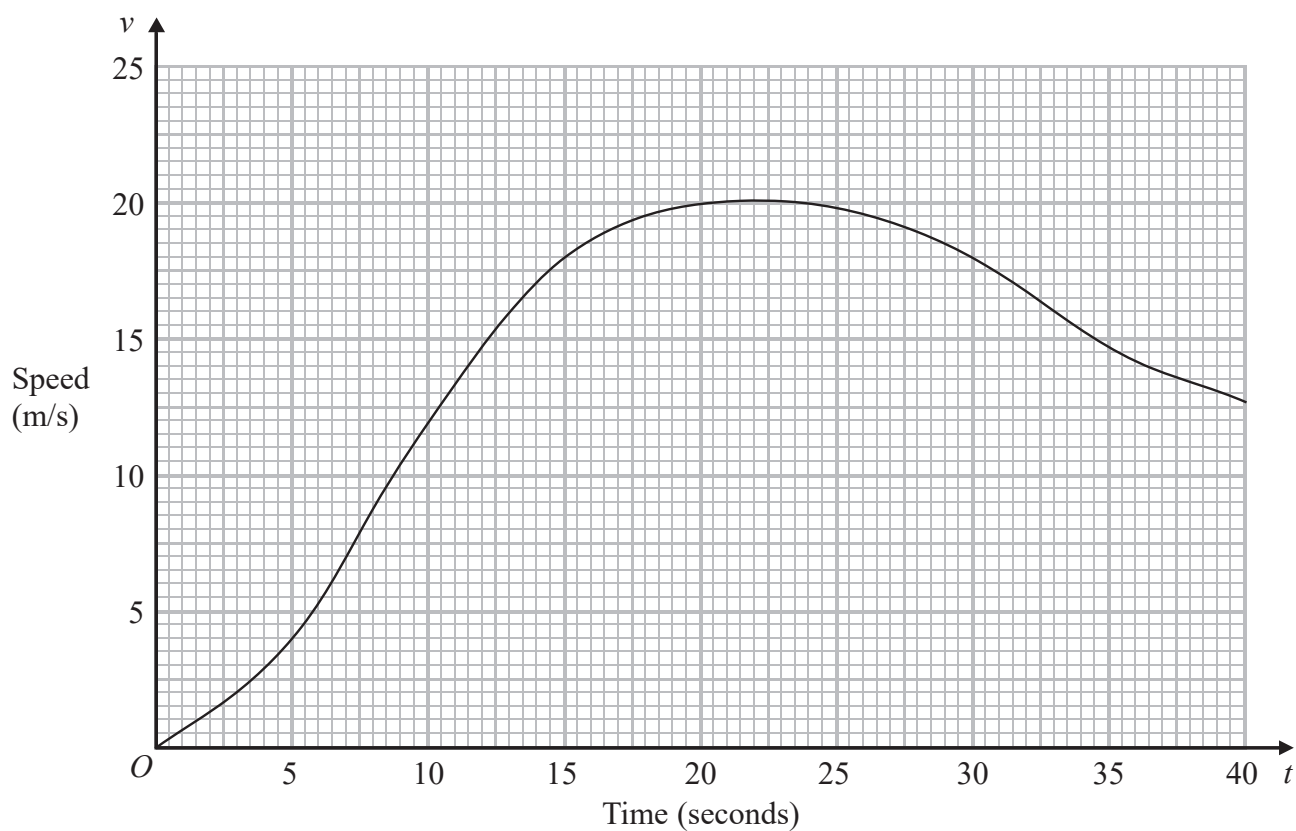
(c) Explain why.

(1)

(Total for Question 10 is 4 marks)

11 A car moves from rest.

The graph gives information about the speed, v metres per second, of the car t seconds after it starts to move.



- (a) (i) Calculate an estimate of the gradient of the graph at $t = 15$

.....
(3)

- (ii) Describe what your answer to part (i) represents.

.....
(1)

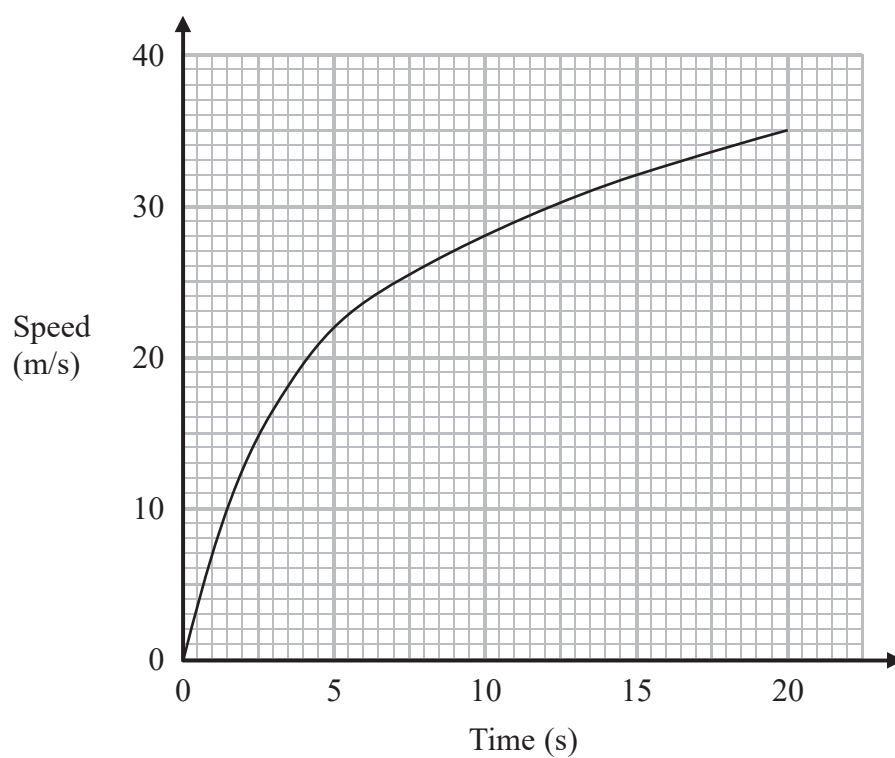
- (b) Work out an estimate for the distance the car travels in the first 20 seconds of its journey.
Use 4 strips of equal width.

.....m

(3)

(Total for Question 11 is 7 marks)

- 12 The graph shows the speed of a car, in metres per second, during the first 20 seconds of a journey.



- (a) Work out an estimate for the distance the car travelled in the first 20 seconds.
Use 4 strips of equal width.

..... metres
(3)

- (b) Is your answer to part (a) an underestimate or an overestimate of the actual distance the car travelled in the first 20 seconds?
Give a reason for your answer.

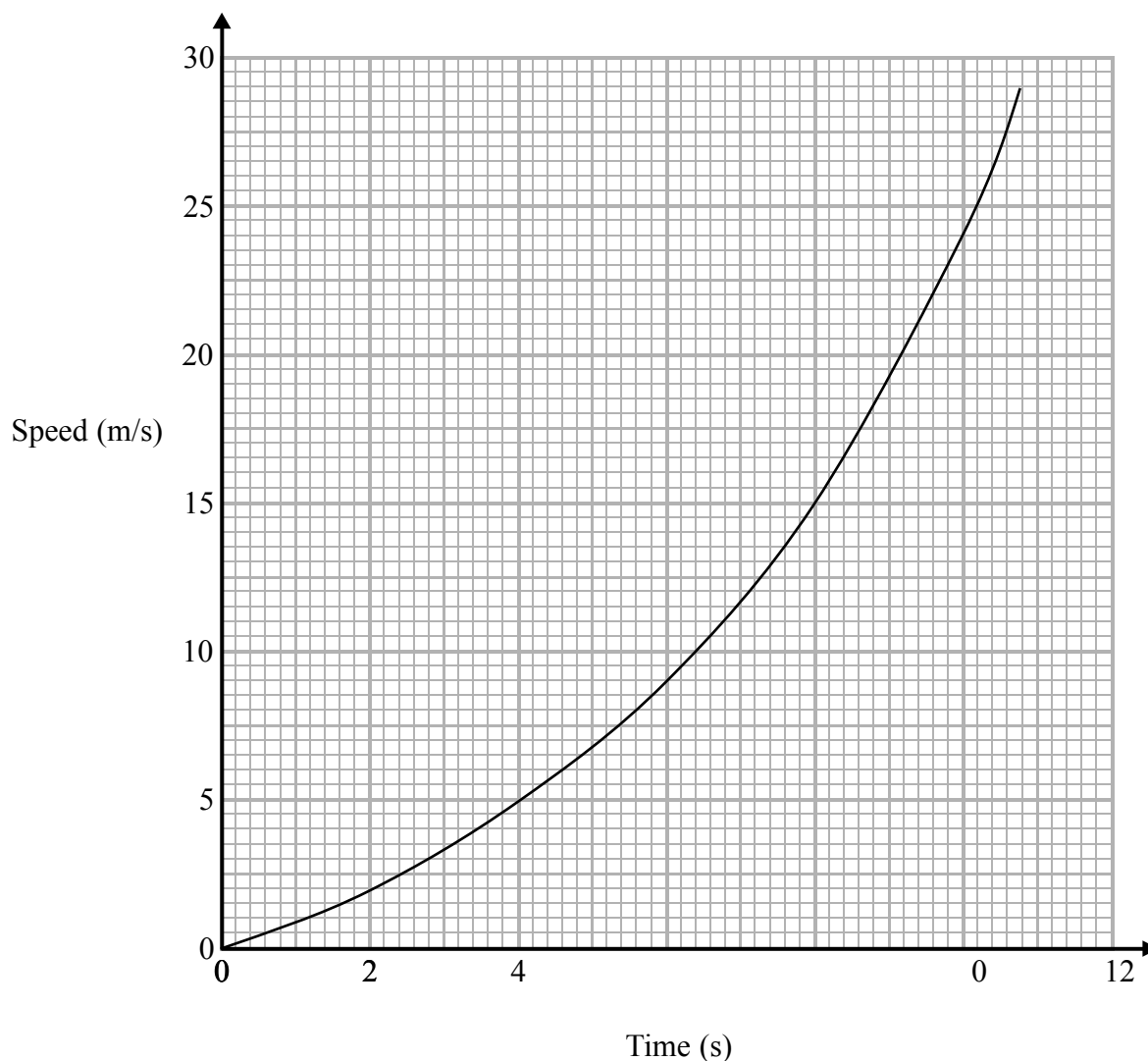
.....

.....

(1)

(Total for Question 12 is 4 marks)

13 Here is a speed-time graph for a car.



- (a) Work out an estimate for the distance the car travelled in the first 10 seconds.
Use 5 strips of equal width.

.....m

(3)

- (b) Is your answer to (a) an underestimate or an overestimate of the actual distance?
Give a reason for your answer.

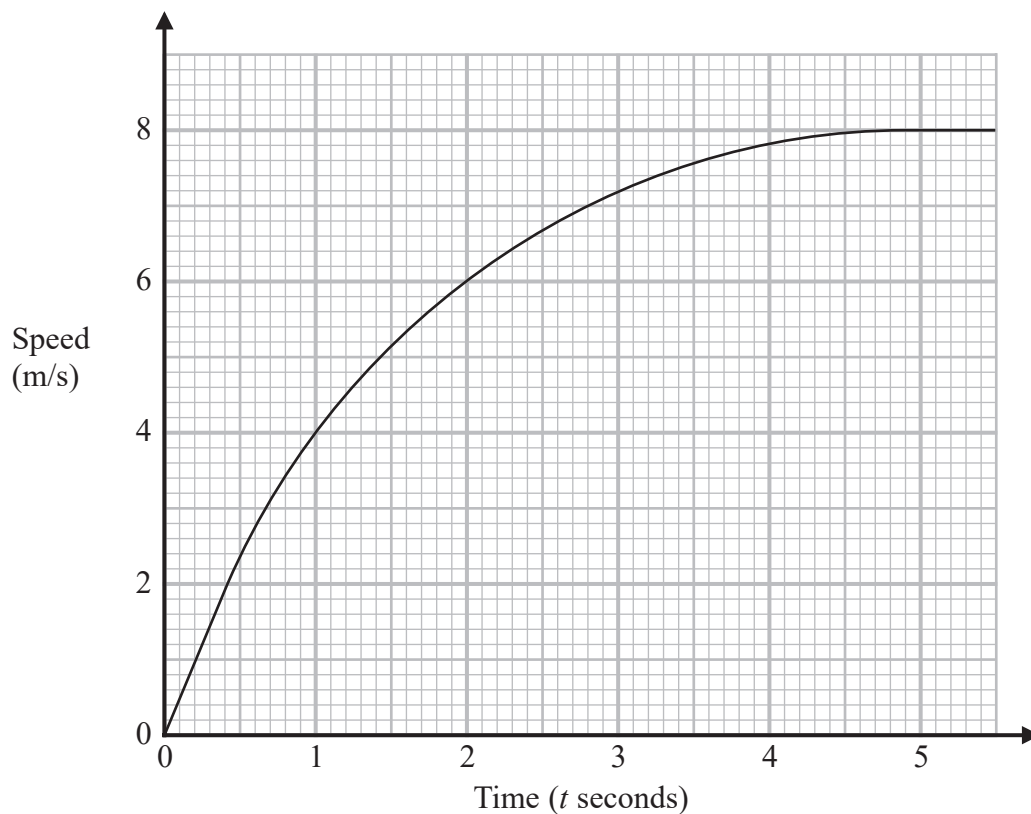
.....

.....

(1)

(Total for Question 13 is 4 marks)

- 14 Here is a speed-time graph showing the speed, in metres per second, of an object t seconds after it started to move from rest.



- (a) Using 3 trapeziums of equal width, work out an estimate for the area under the graph between $t = 1$ and $t = 4$

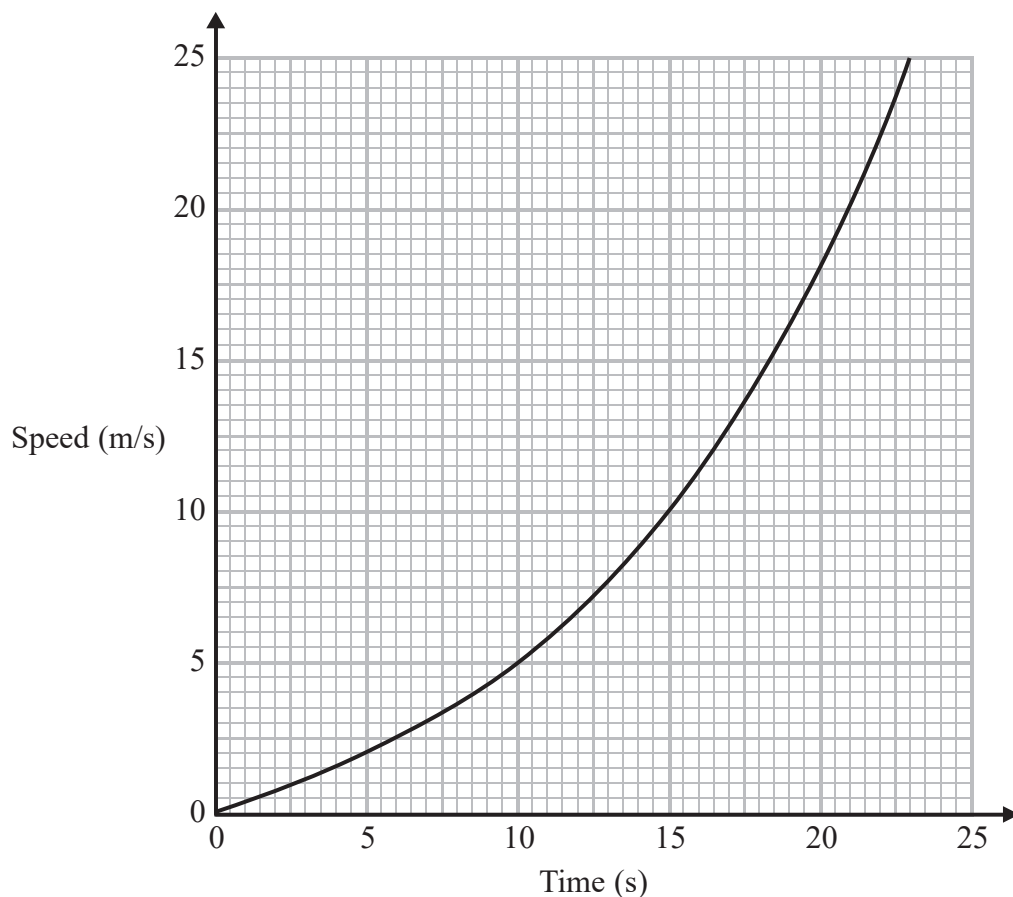
.....
(3)

- (b) What does this area represent?

.....
(1)

(Total for Question 14 is 4 marks)

15 Here is a speed-time graph for a train.



- (a) Work out an estimate for the distance the train travelled in the first 20 seconds.
Use 4 strips of equal width.

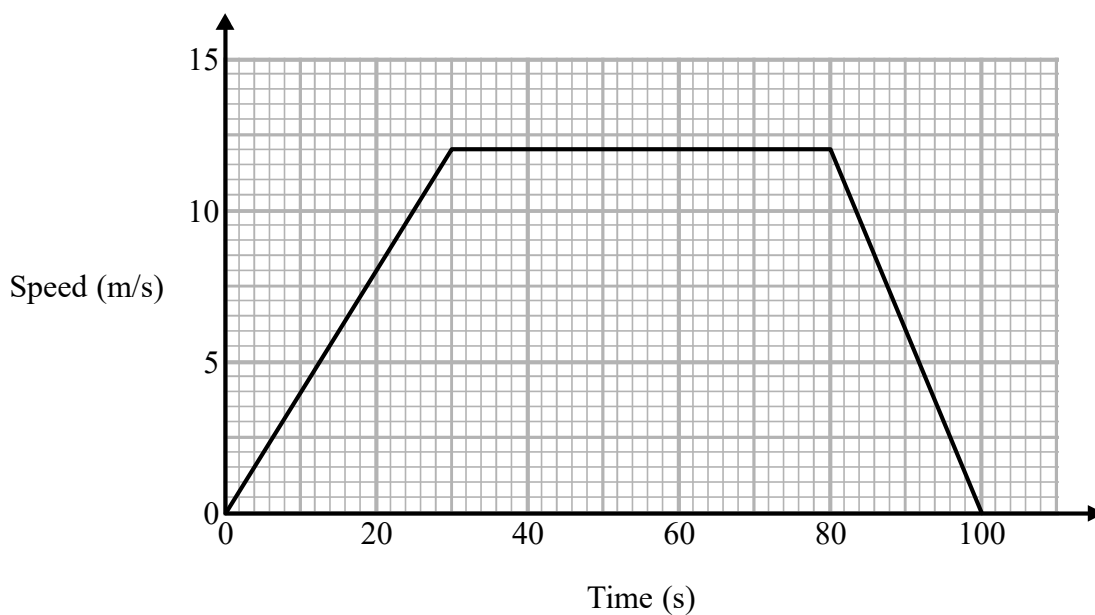
..... m
(3)

- (b) Is your answer to (a) an underestimate or an overestimate of the actual distance the train travelled?
Give a reason for your answer.

.....
.....
(1)

(Total for Question 15 is 4 marks)

- 16 Here is a speed-time graph for a train journey between two stations.
The journey took 100 seconds.



- (a) Calculate the time taken by the train to travel half the distance between the two stations.
You must show all your working.

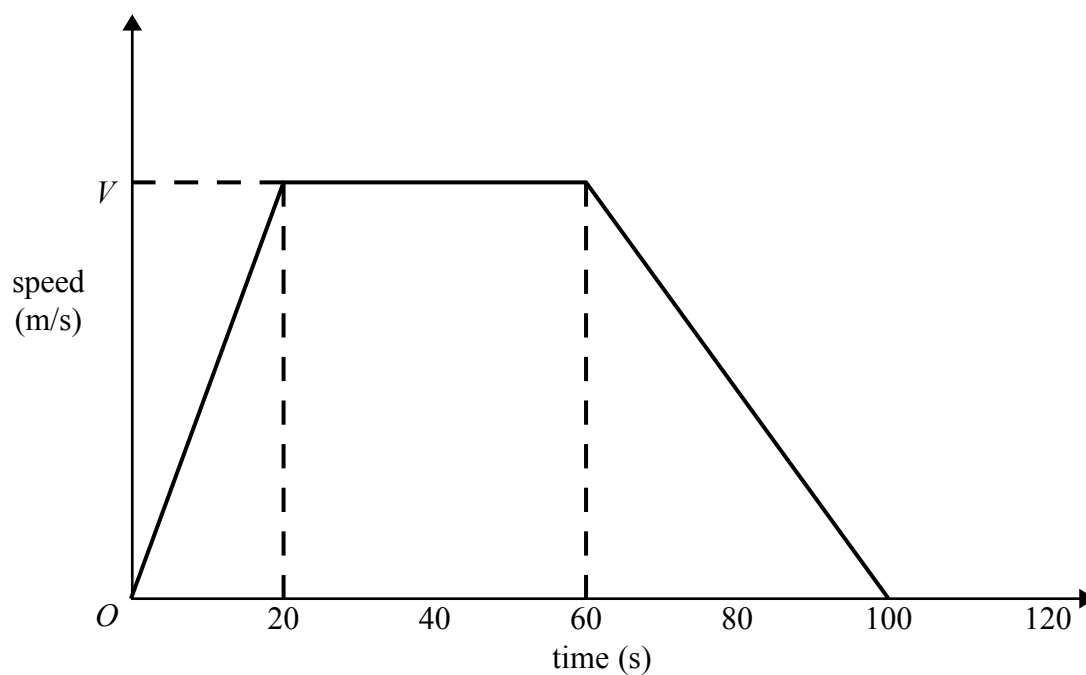
..... seconds
(4)

- (b) Compare the acceleration of the train during the first part of its journey with the acceleration of the train during the last part of its journey.

.....
.....
.....
(1)

(Total for Question 16 is 5 marks)

- 17 Here is a speed-time graph for a car journey.
The journey took 100 seconds.



The car travelled 1.75 km in the 100 seconds.

- (a) Work out the value of V .

.....
(3)

- (b) Describe the acceleration of the car for each part of this journey.

.....
.....
.....
.....
(2)

(Total for Question 17 is 5 marks)