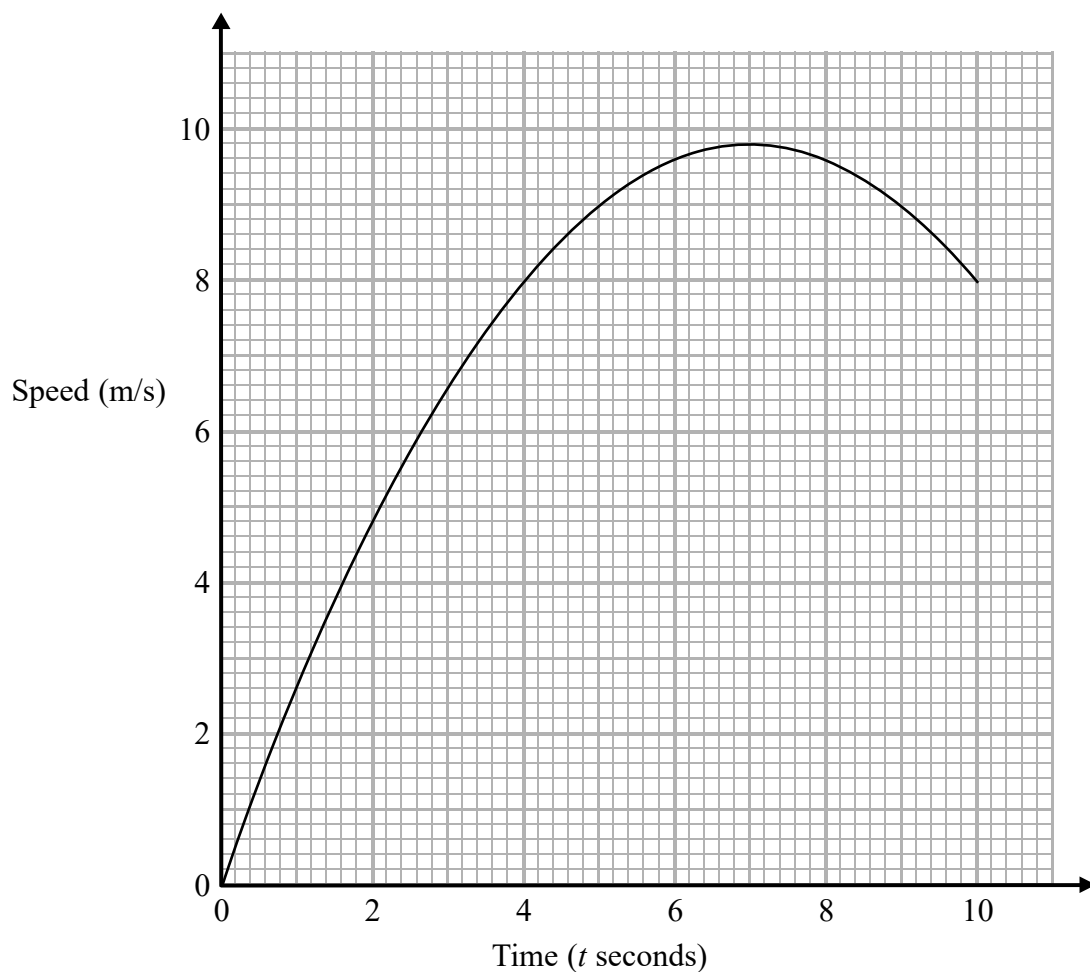


1 Karol runs in a race.

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.

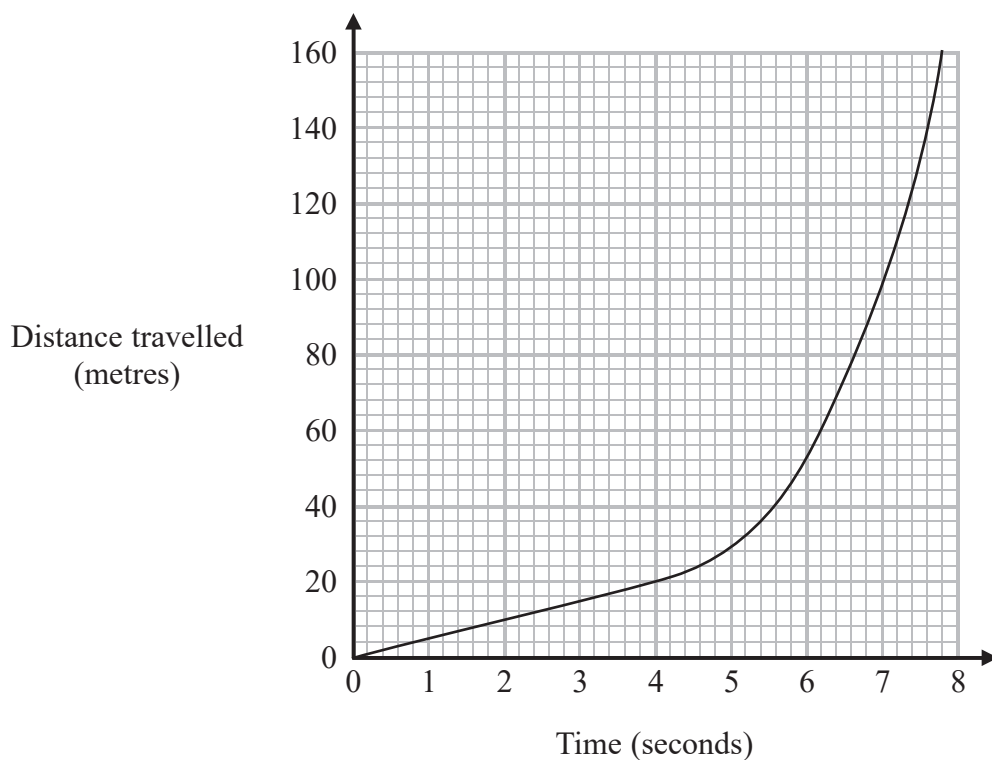
(2)

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

(1)

(Total for Question 1 is 6 marks)

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

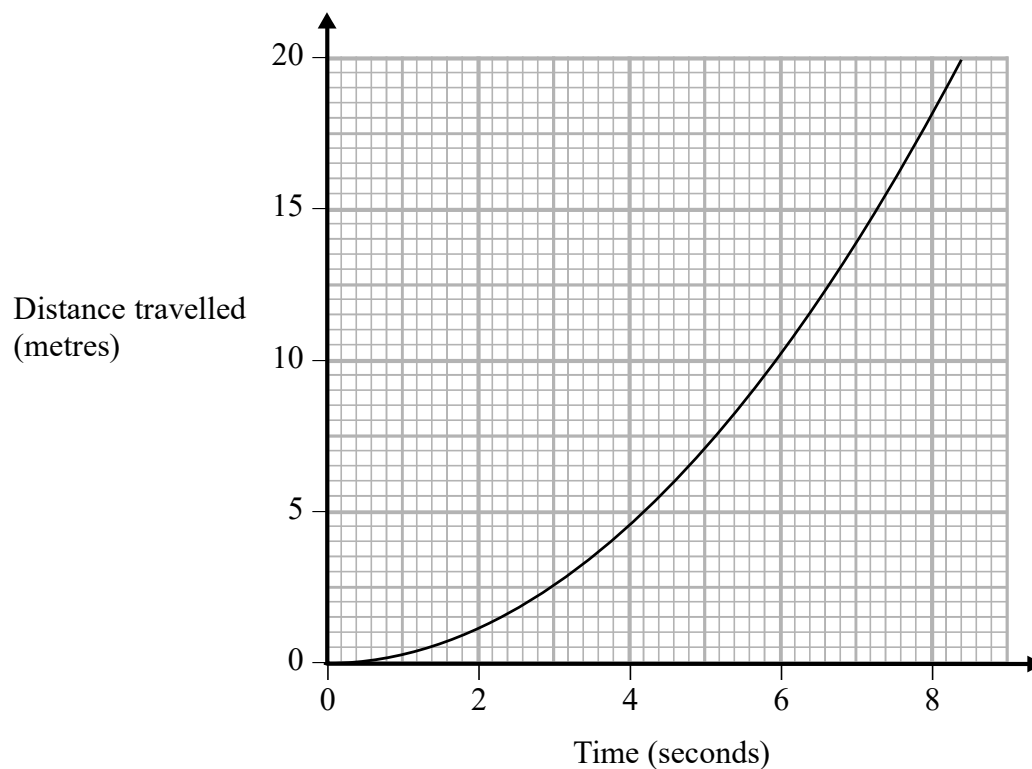


Use the graph to estimate the speed of the car at time 5 seconds.

..... m/s

(Total for Question 2 is 3 marks)

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

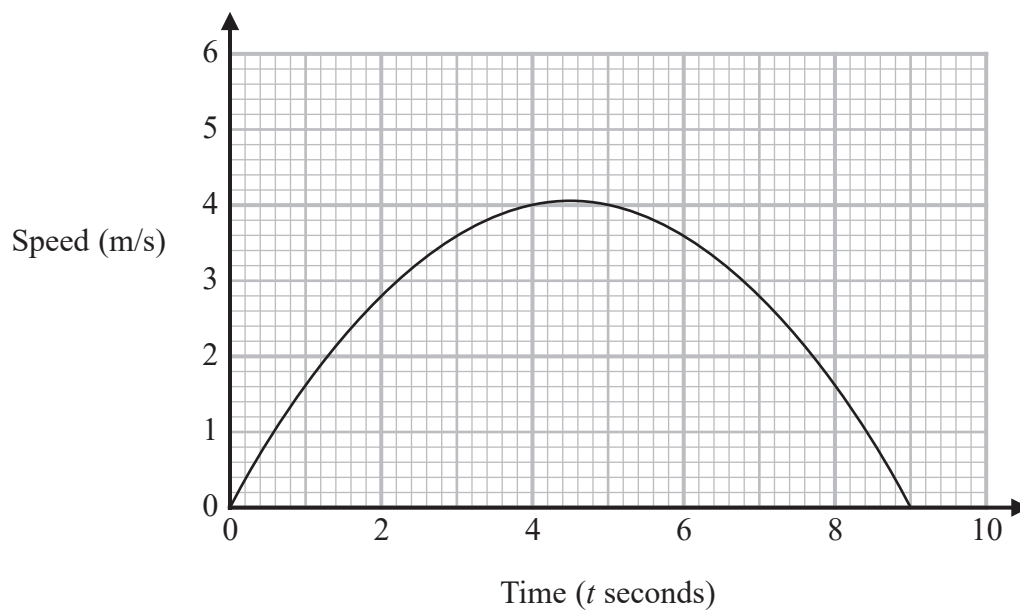


Work out an estimate of the speed, in m/s, of the cyclist at time 6 seconds.

..... m/s

(Total for Question 3 is 3 marks)

4 Here is a speed-time graph.



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

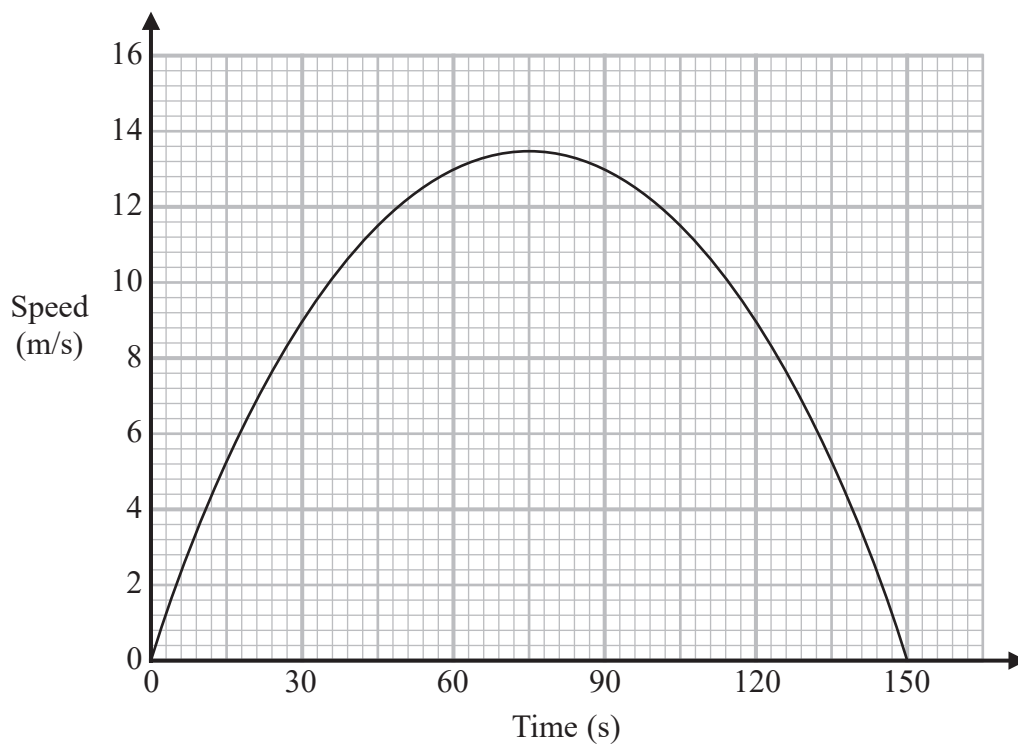
.....
(3)

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

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

(Total for Question 4 is 4 marks)

5 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.

.....

.....

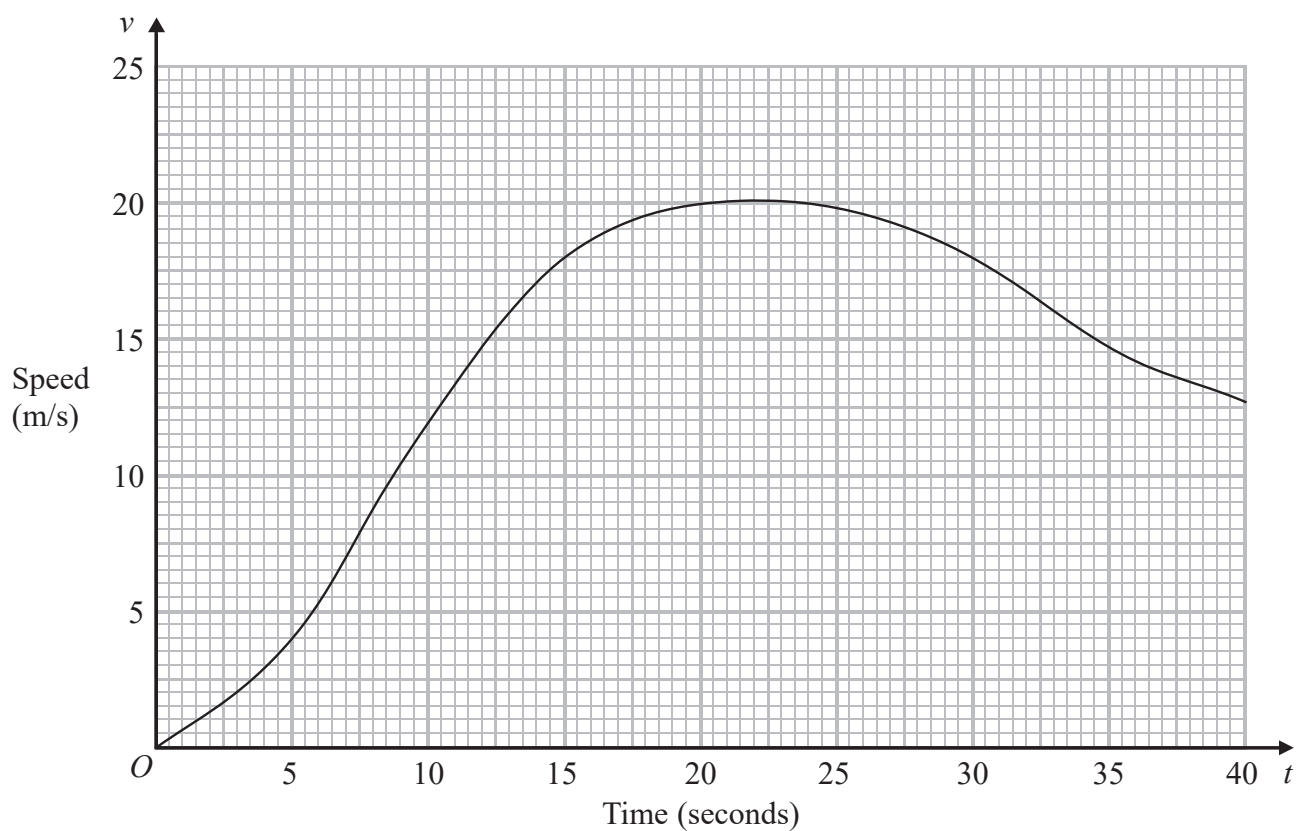
.....

(1)

(Total for Question 5 is 4 marks)

6 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)

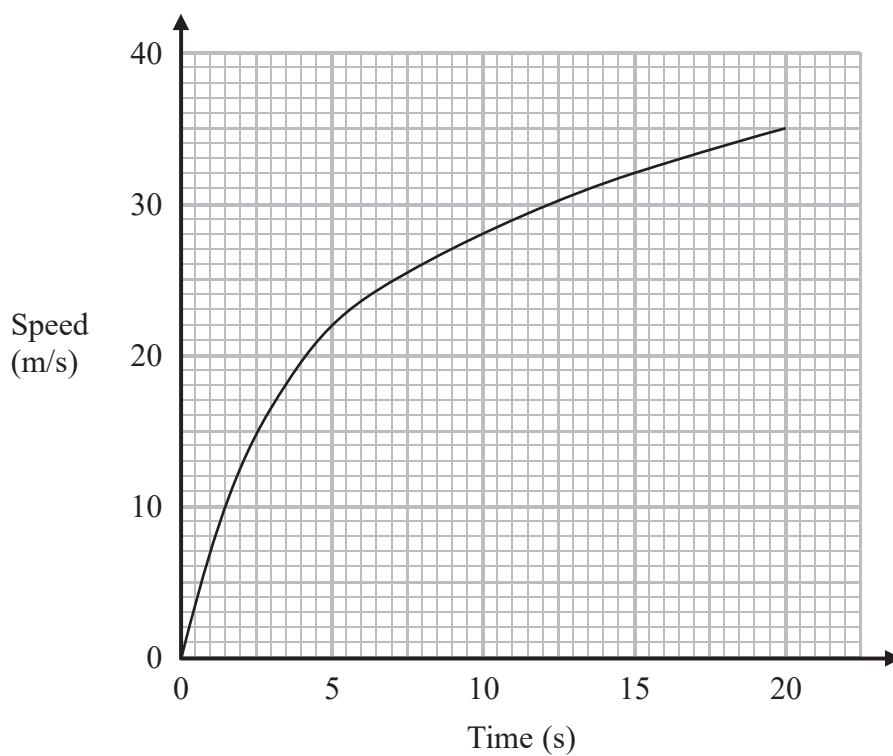
- (b) Work out an estimate for the distance the car travels in the first 20 seconds of its journey.
Use 4 strips of equal width.

.....m

(3)

(Total for Question 6 is 7 marks)

- 7 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.

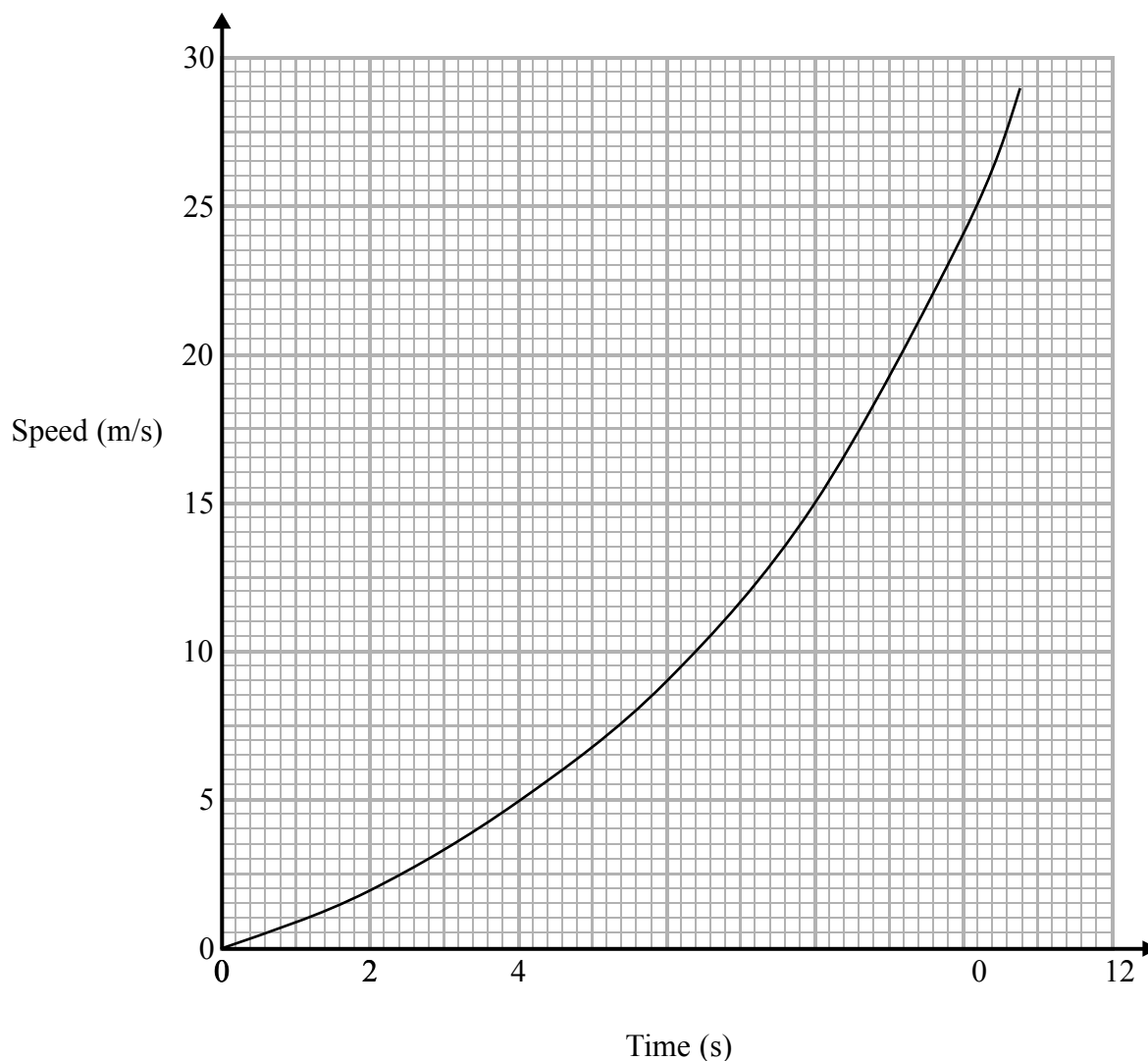
.....

.....

(1)

(Total for Question 7 is 4 marks)

8 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.

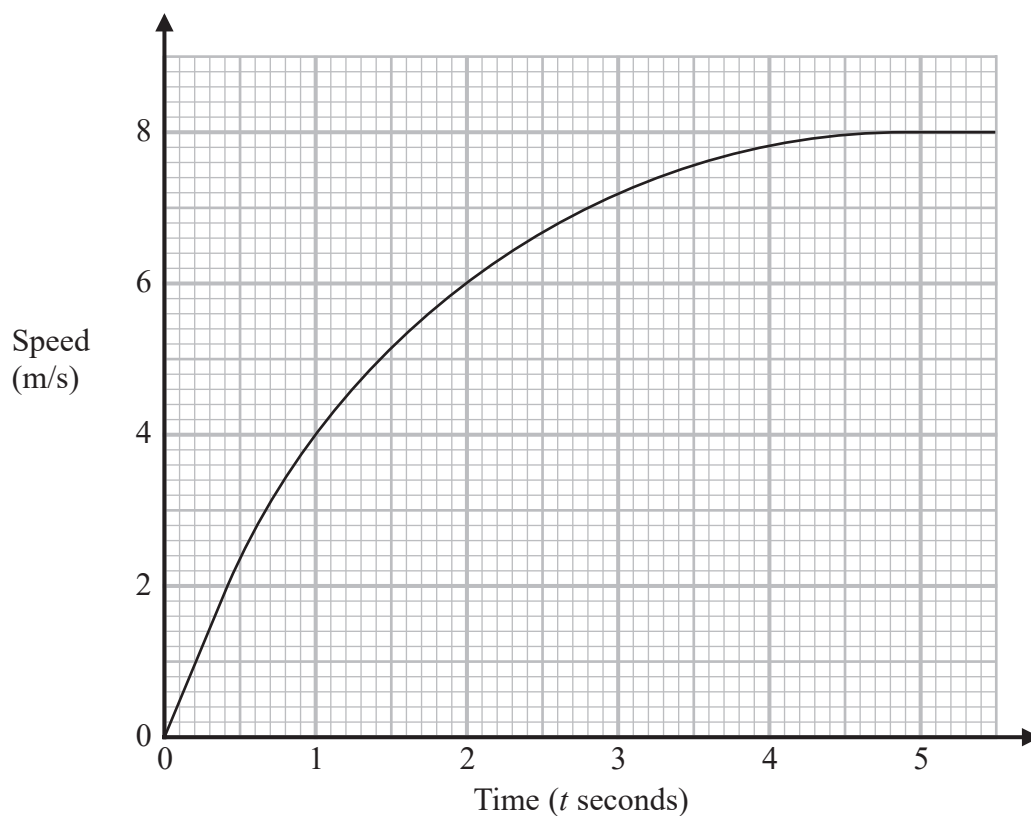
.....

.....

(1)

(Total for Question 8 is 4 marks)

- 9 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 $t = 4$

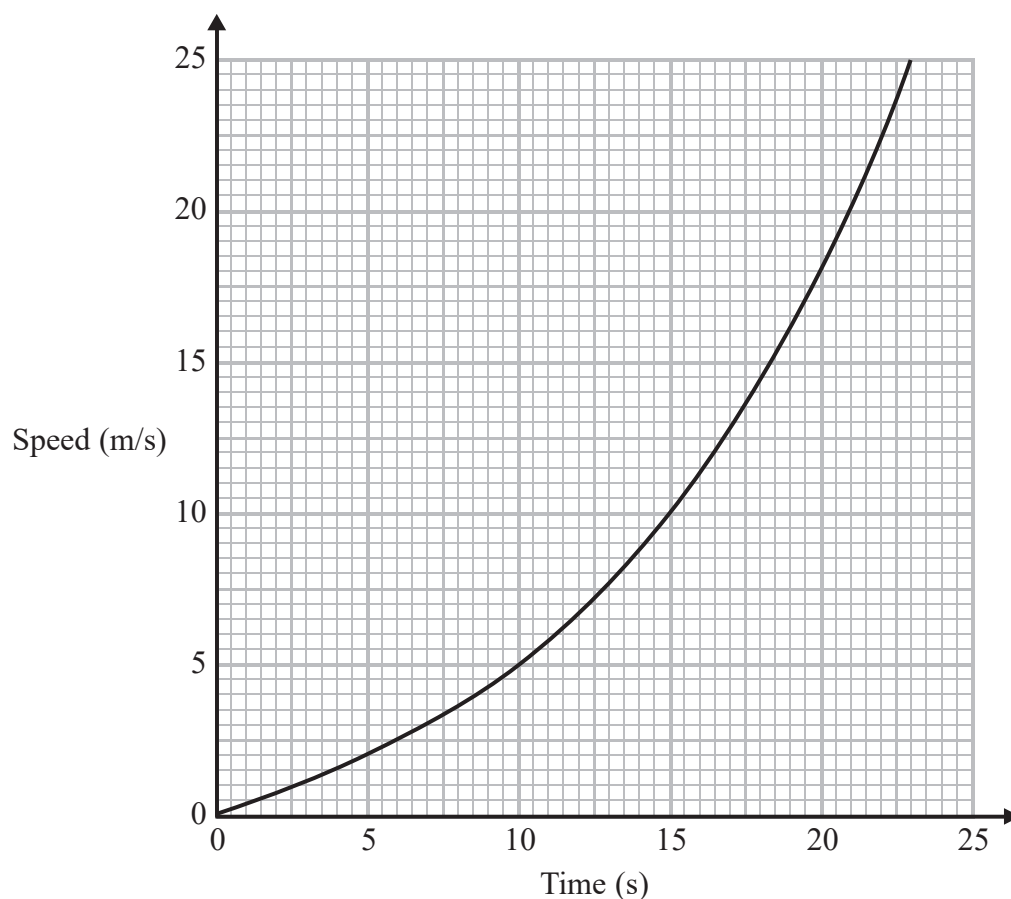
.....
(3)

- (b) What does this area represent?

.....
(1)

(Total for Question 9 is 4 marks)

10 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.

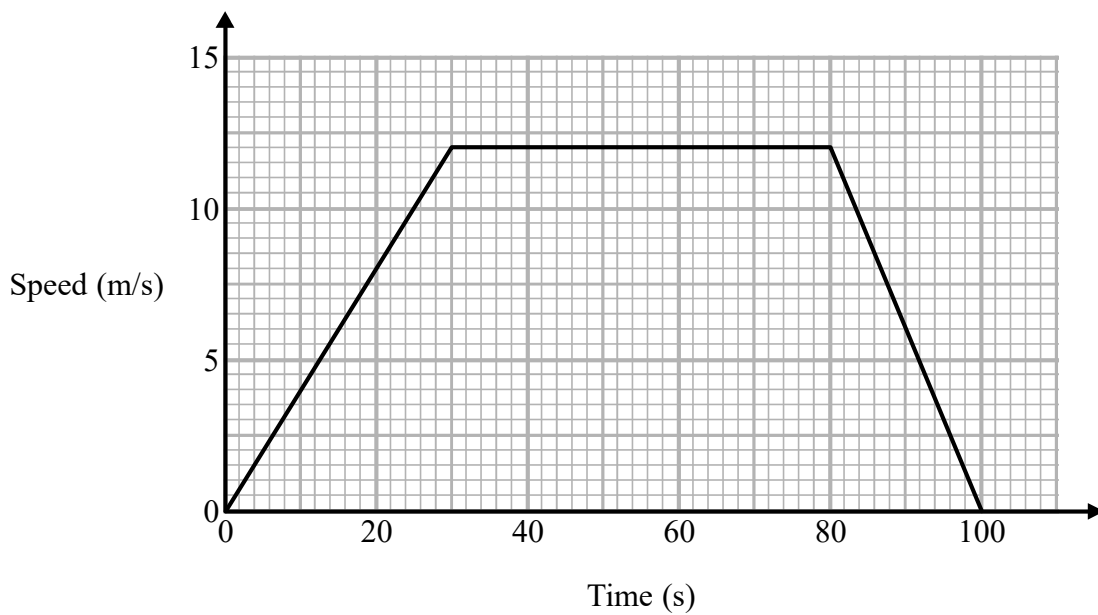
..... m
(3)

- (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 10 is 4 marks)

- 11 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.

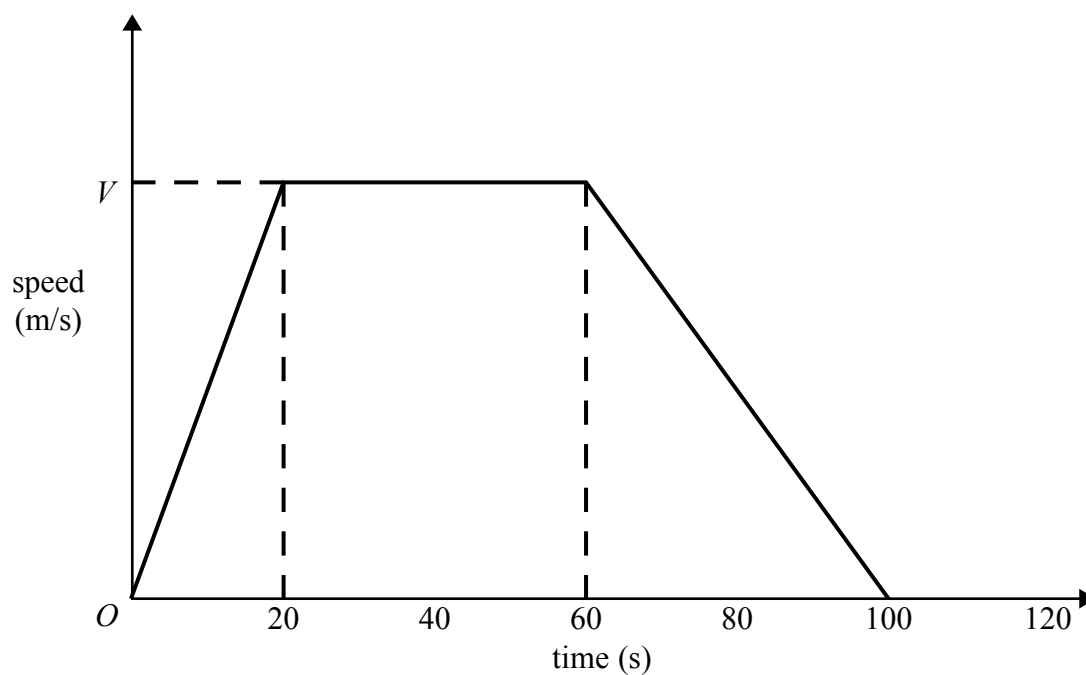
..... seconds
(4)

- (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 11 is 5 marks)

- 12** 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 12 is 5 marks)