IGCSE · Cambridge (CIE) · Maths

58 mins 13 questions

Calculator Questions

Real-Life Graphs

Conversion Graphs / Distance-Time Graphs / Speed-Time Graphs / Rates-of-Change Graphs

Medium (5 questions)	/21
Hard (5 questions)	/21
Very Hard (3 questions)	/16
Total Marks	**/58**

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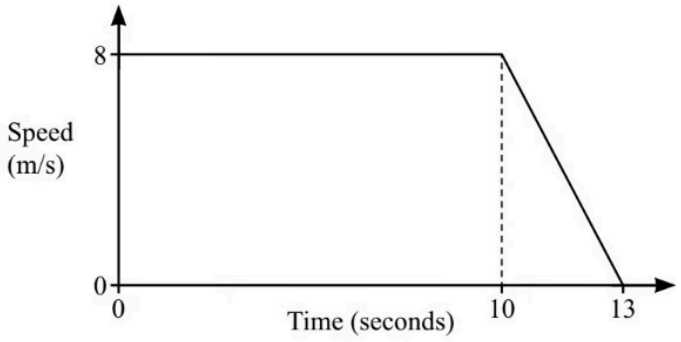
Medium Questions

1 (a)



NOT TO SCALE

The diagram shows the speed–time graph of part of a car journey.

Find the deceleration of the car between 10 and 13 seconds.

.....m/s^2

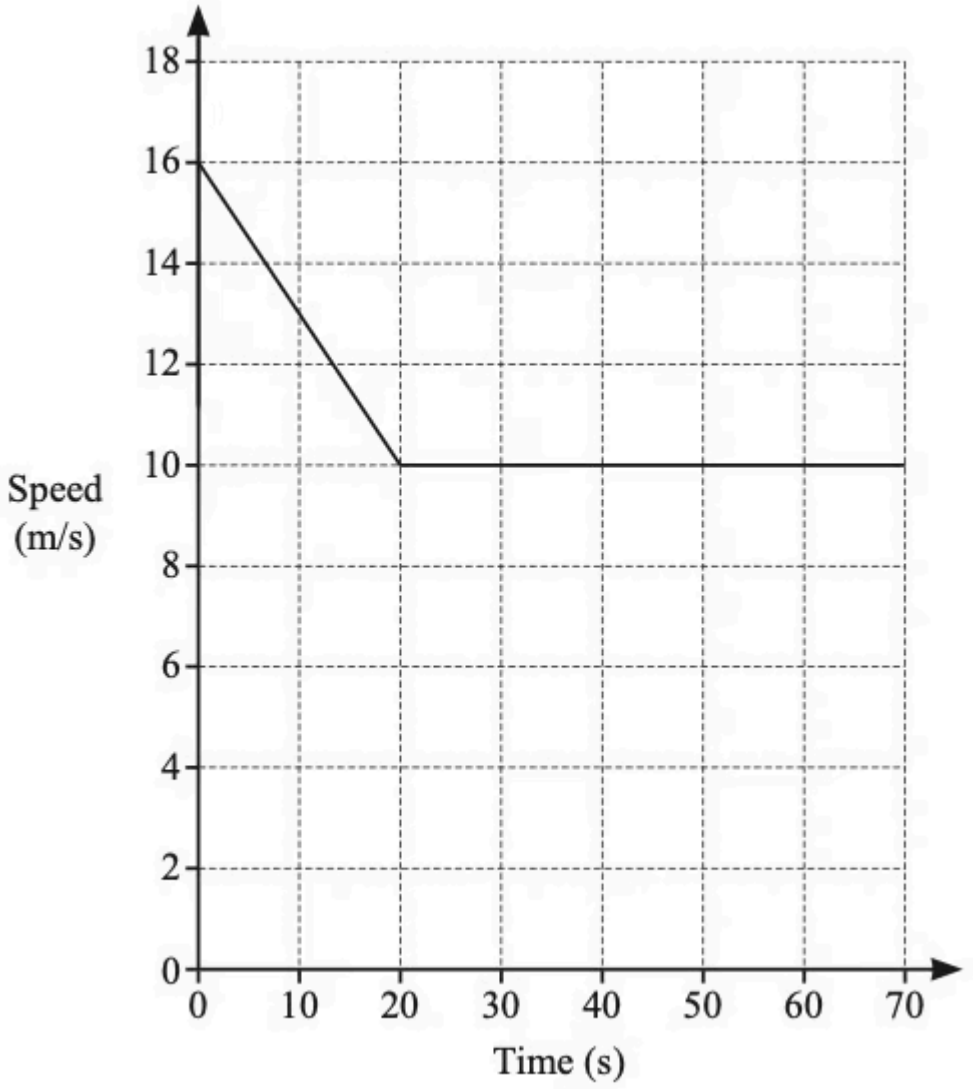
(1 mark)

(b) Calculate the total distance travelled during the 13 seconds.

..... m

(2 marks)

2 (a)



The diagram shows the speed–time graph for 70 seconds of a car journey.

Calculate the deceleration of the car during the first 20 seconds.

..... m/s^2

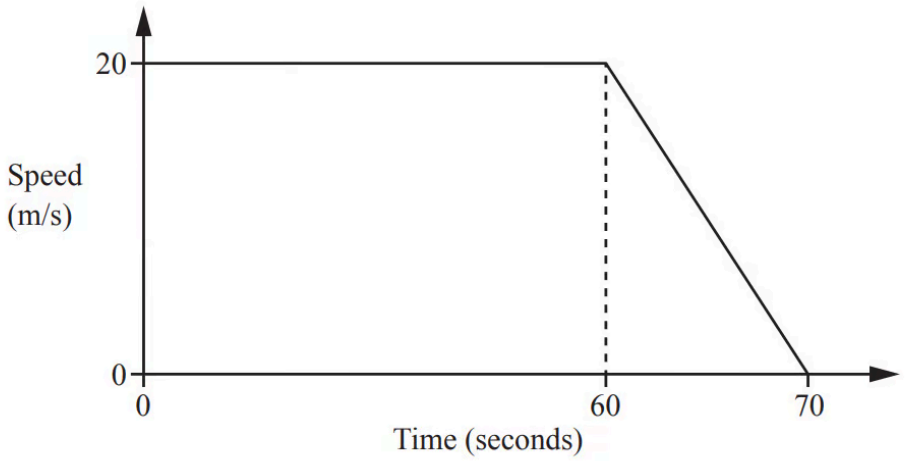
(1 mark)

(b) Calculate the total distance travelled by the car during the 70 seconds.

..... m

(3 marks)

3 (a)



The diagram shows information about the final 70 seconds of a car journey.

Find the deceleration of the car between 60 and 70 seconds.

.....m/s^2

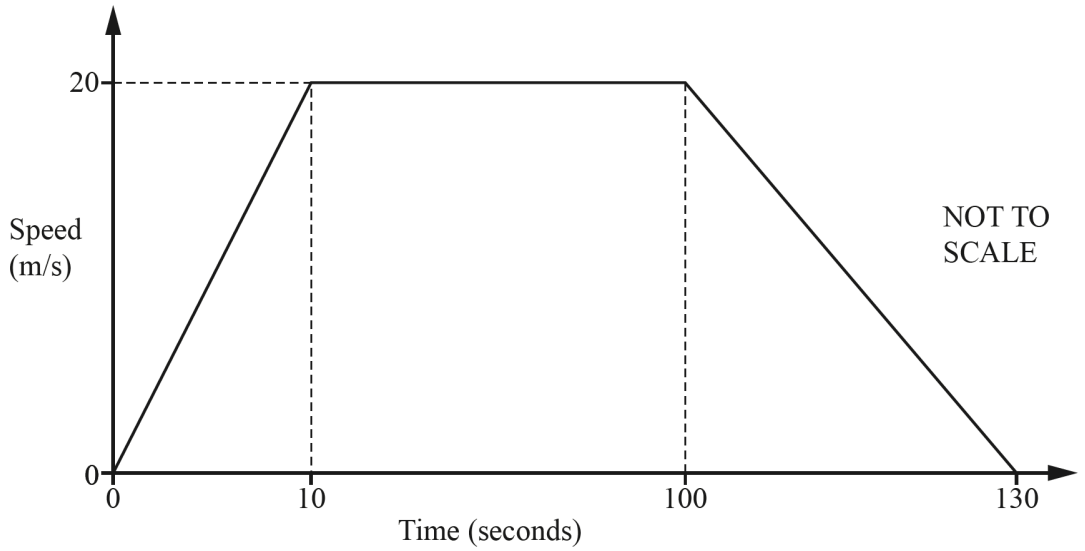
(1 mark)

(b) Find the distance travelled by the car during the 70 seconds.

.....m

(3 marks)

4 (a)



The speed-time graph shows information about the journey of a tram between two stations.

Calculate the distance between the two stations.

.....m

(3 marks)

(b) Calculate the average speed of the tram for the whole journey.

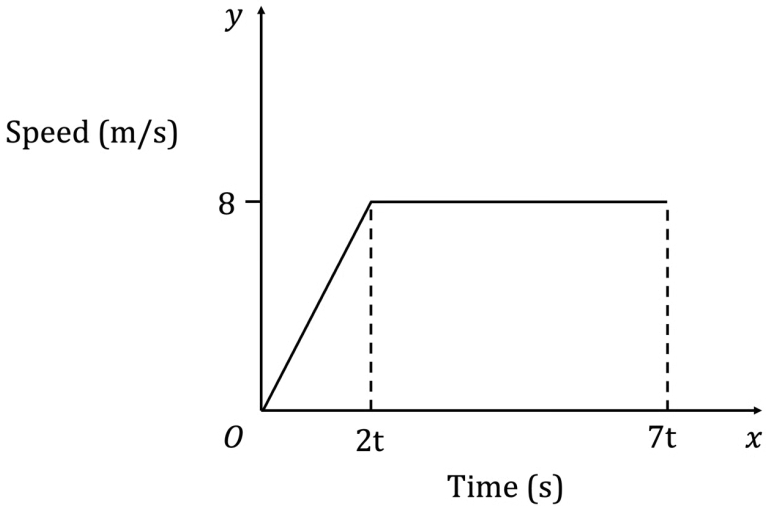
..... m/s

(1 mark)

5 (a) A cyclist starts from rest and accelerates at a constant rate for $2t$ seconds until they reach $8\ \text{m/s}$.

They then travel at a constant speed for $5t$ seconds.

The diagram shows a speed-time graph of their journey.



The distance travelled by the cyclist in the first $7t$ seconds is $200\ \text{m}$.

Work out the exact value of t.

(2 marks)

(b) Find the acceleration during the first $2t$ seconds of the journey.

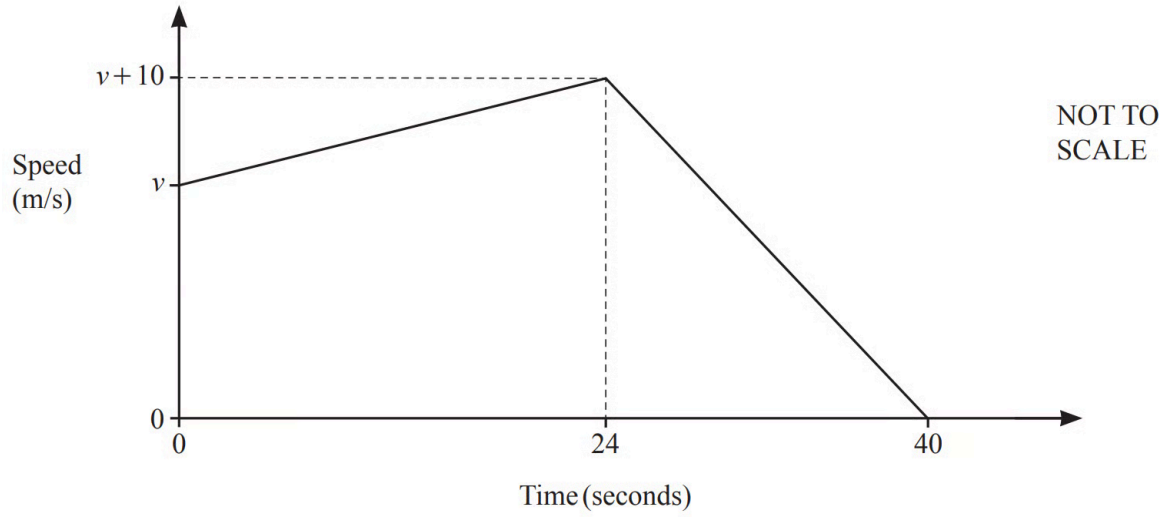
(2 marks)

(c) Work out the average speed for their journey.

(2 marks)

Hard Questions

1



The diagram shows the speed–time graph for the final 40 seconds of a car journey.

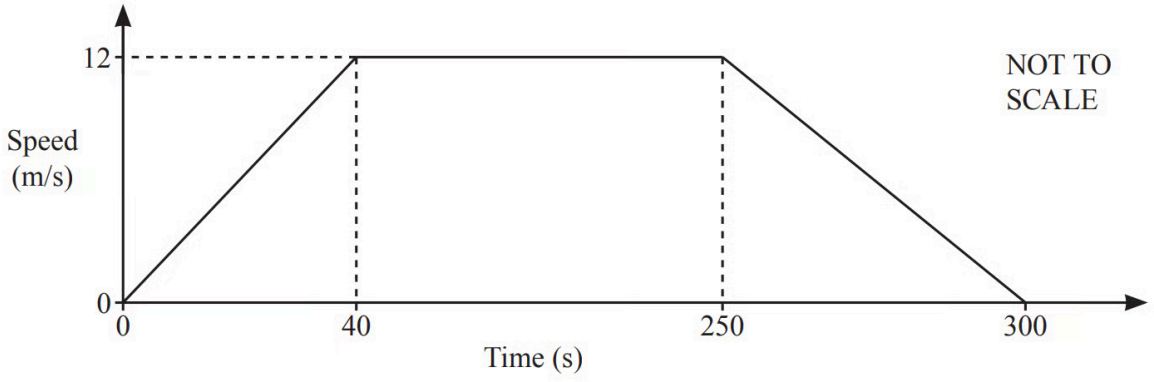
At the start of the 40 seconds the speed is v m/s.

Find the acceleration of the car during the first 24 seconds.

..... m/s^2

(1 mark)

2 (a) The diagram shows the speed–time graph of a train journey between two stations.



Find the acceleration of the train during the first 40 seconds.

..... m/s^2

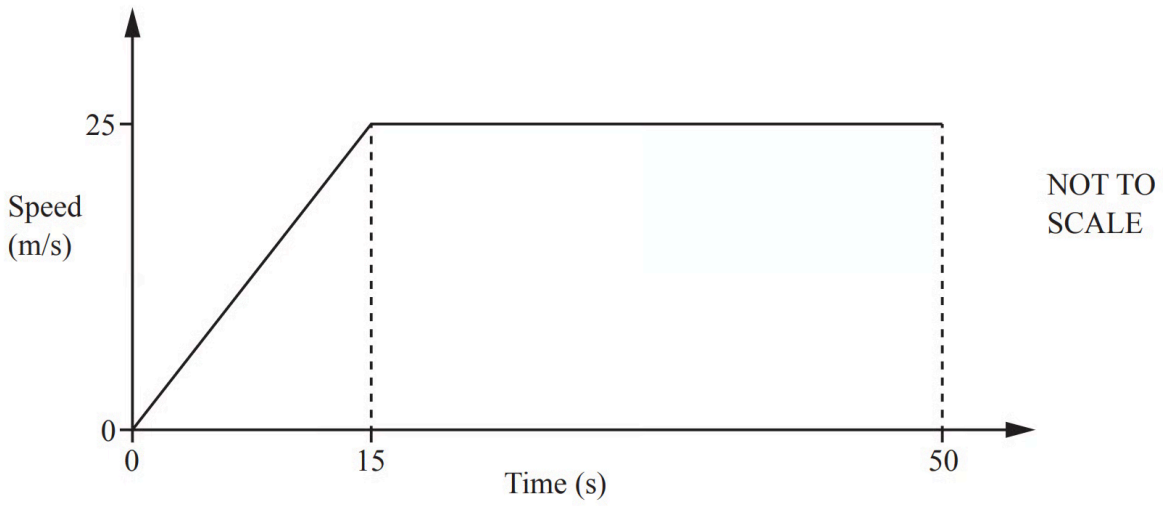
(1 mark)

(b) Calculate the distance between the two stations.

..... m

(3 marks)

3 (a)



The speed–time graph shows the first 50 seconds of a journey.

Calculate the acceleration during the first 15 seconds.

.....m/s^2

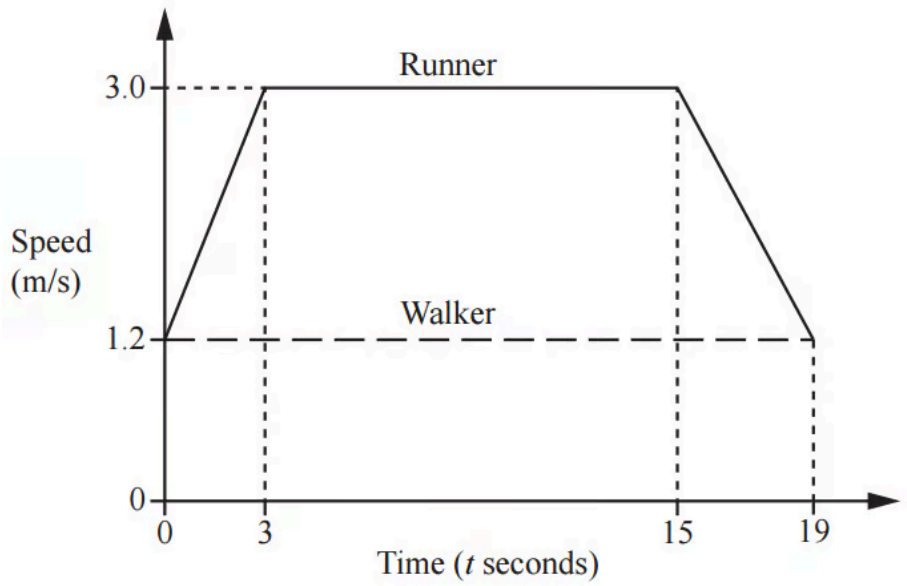
(1 mark)

(b) Calculate the distance travelled in the 50 seconds.

.....m

(3 marks)

4 (a) The diagram shows the speed–time graph for part of a journey for two people, a runner and a walker.



NOT TO SCALE

Calculate the acceleration of the runner for the first 3 seconds.

..... m/s^2

(1 mark)

(b) Calculate the total distance travelled by the runner in the 19 seconds.

..... m

(3 marks)

(c) The runner and the walker are travelling in the same direction along the same path.

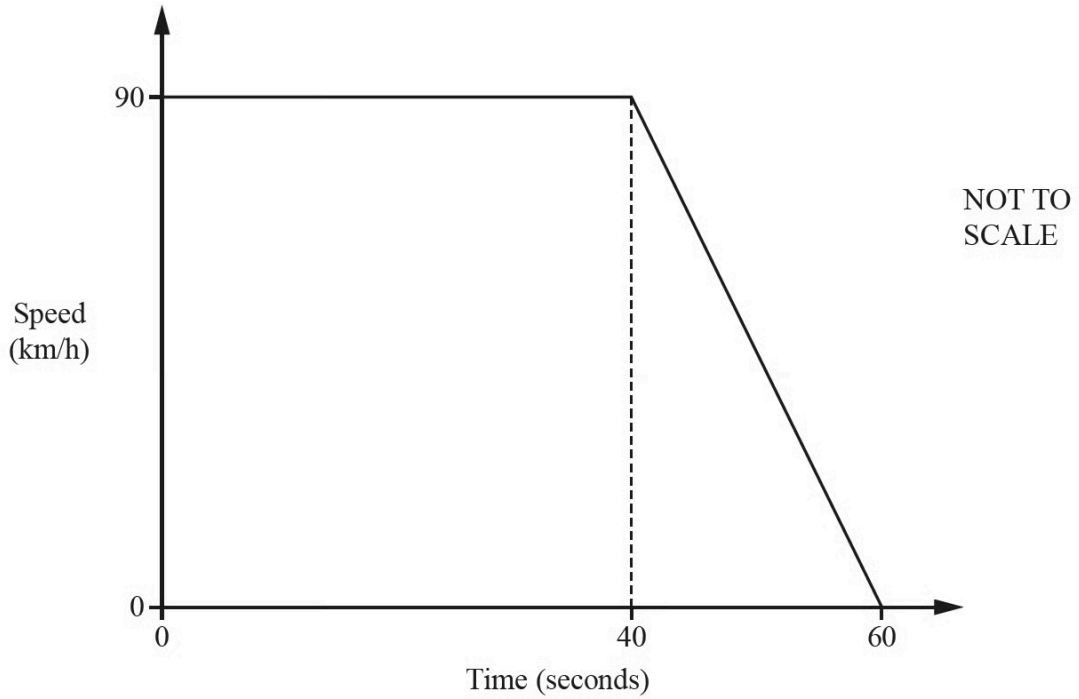
When $t = 0$, the runner is 10 metres behind the walker.

Find how far the runner is ahead of the walker when $t = 19$.

..... m

(3 marks)

5 (a)



The diagram shows the speed–time graph for 60 seconds of a car journey.

Change 90 km/h to m/s.

..... m/s

(2 marks)

(b) Find the deceleration of the car in m/s^2.

.....m/s^2

(1 mark)

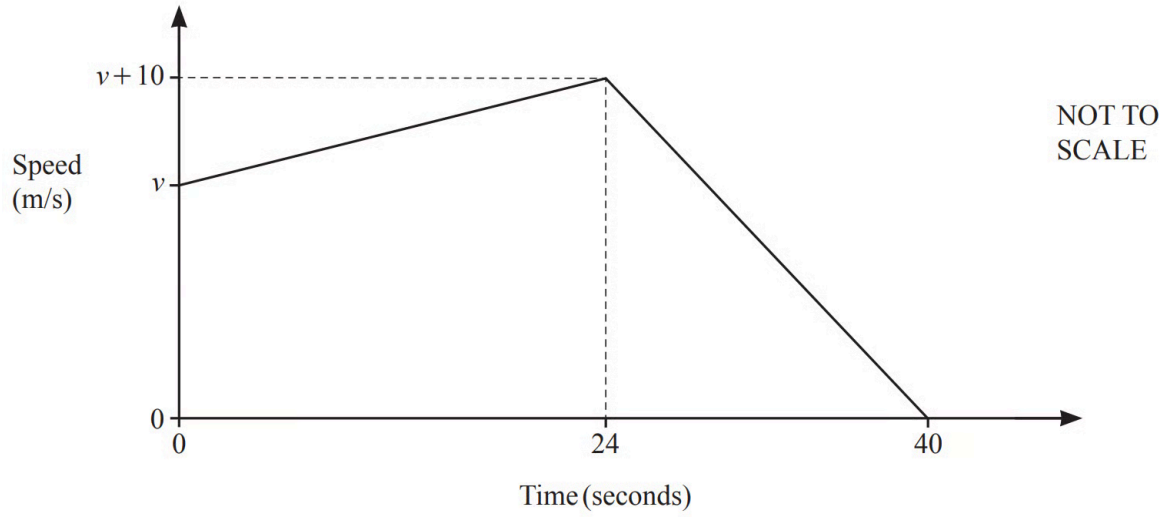
(c) Find the distance travelled, in metres, in the 60 seconds.

.....m

(2 marks)

Very Hard Questions

1



The diagram shows the speed–time graph for the final 40 seconds of a car journey.

At the start of the 40 seconds the speed is v m/s.

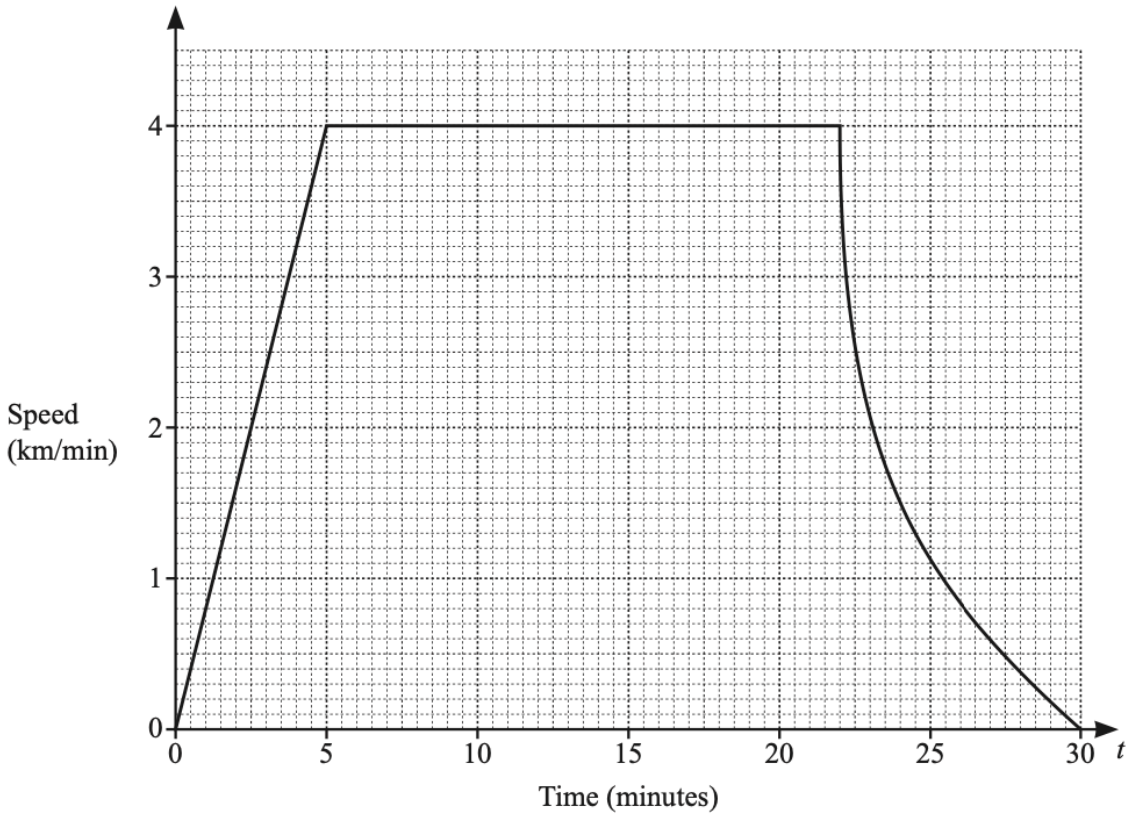
The total distance travelled during the 40 seconds is 1.24 **kilometres**.

Find the value of v.

$v =$ .....

(4 marks)

2 (a)



The speed–time graph shows information about a train journey.

By drawing a suitable tangent to the graph, estimate the gradient of the curve at $t = 24$.

(3 marks)

(b) What does this gradient represent?

(1 mark)

(c) Work out the distance travelled by the train when it is travelling at constant speed.

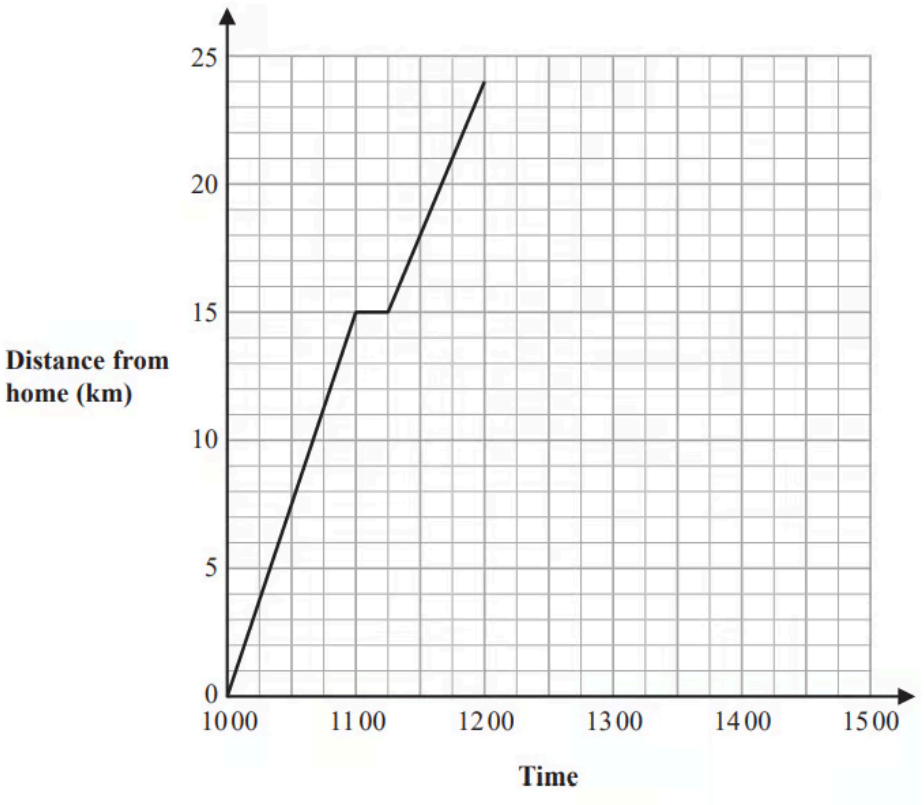
..... km

(2 marks)

3 (a) 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.



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 mark)

(b) 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.

Show all this information on the distance-time graph.

(2 marks)

(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 marks)