



EXAM PAPERS PRACTICE

Speed, Distance & Time

Question Paper 1



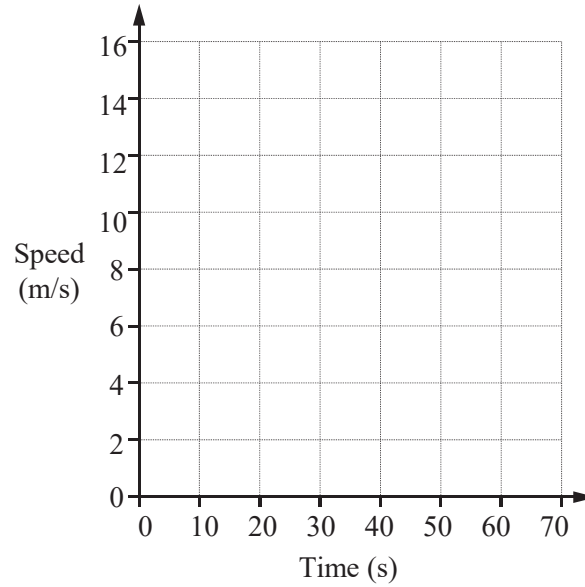
Question 1

Petra begins a journey in her car.

She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds.

She then travels at a constant speed for 40 seconds.

On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey.



[2]



Question 2

Amar cycles at a speed of 18 km/h.
It takes him 55 minutes to cycle between two villages.

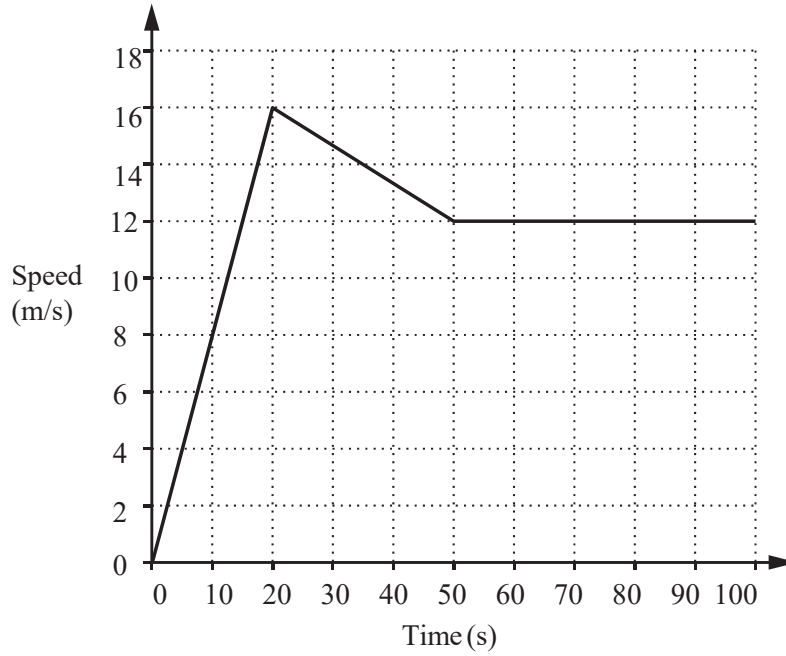
Calculate the distance between the two villages.

[2]



Question 3

The diagram shows information about the first 100 seconds of a car journey.



- (a) Calculate the acceleration during the first 20 seconds of the journey. [1]
- (b) Work out the total distance travelled by the car in the 100 seconds. [3]



Question 4

A train travels for m minutes at a speed of x metres per second.

- (a) Find the distance travelled, in **kilometres**, in terms of m and x .
Give your answer in its simplest form.

[2]

- (b) When $m = 5$, the train travels 10.5 km.

Find the value of x .

[2]



Question 5

A car of length 4.3 m is travelling at 105 km/h.
It passes over a bridge of length 36 m.

[3]

Calculate the time, in seconds, it takes to pass over the bridge **completely**.



Question 6

A car travels at 56km/h.

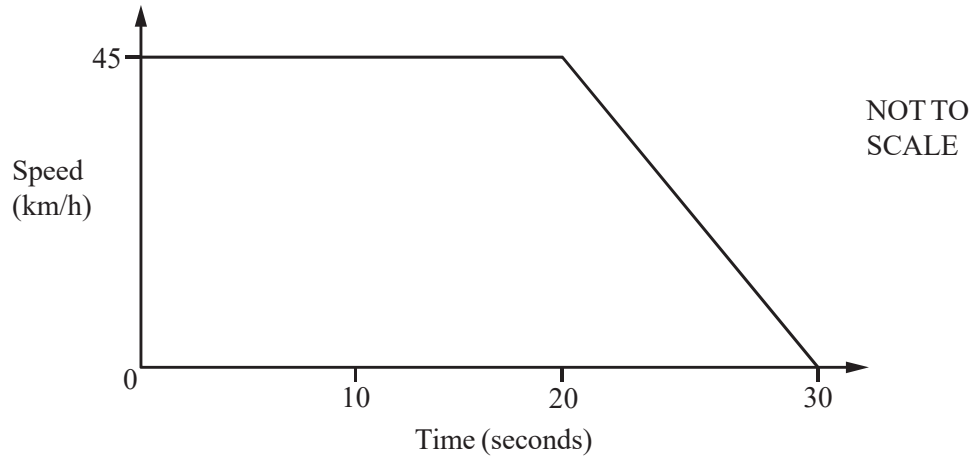
s [4]

Find the time it takes to travel 300 metres.

Give your answer in seconds correct to the nearest second.



Question 7



The diagram shows the speed-time graph of a car.
The car travels at 45 km/h for 20 seconds.
The car then decelerates for 10 seconds until it stops.

(a) Change 45 km/h into m/s.

[2]

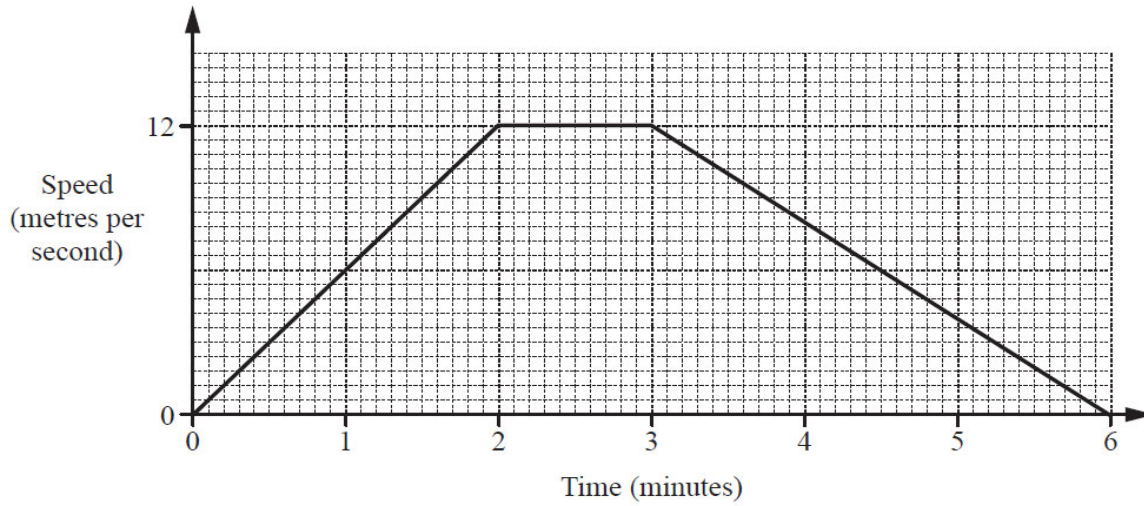
(b) Find the deceleration of the car, giving your answer in m/s^2 .

[1]

(c) Find the distance travelled by the car during the 30 seconds, giving your answer in metres.

[3]

Question 8

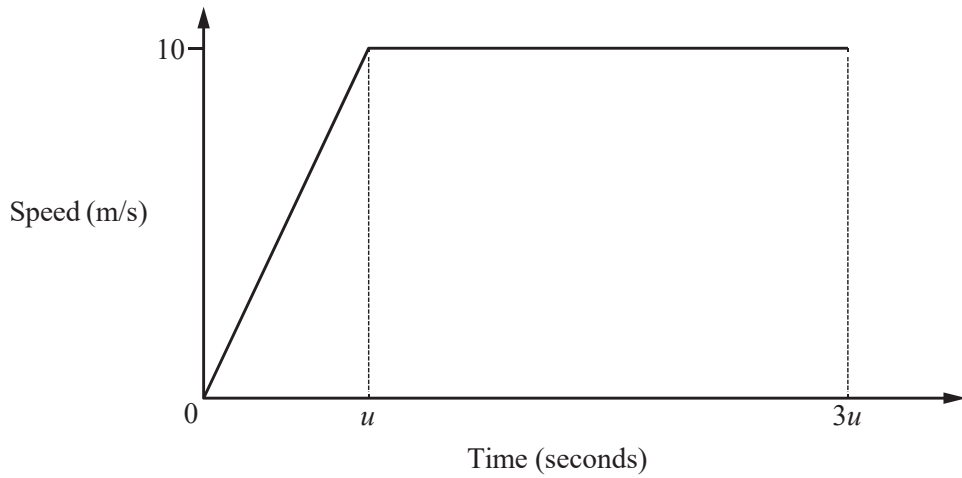


A tram leaves a station and accelerates for 2 **minutes** until it reaches a speed of 12 metres per second. It continues at this speed for 1 minute. It then decelerates for 3 minutes until it stops at the next station. The diagram shows the speed-time graph for this journey.

Calculate the distance, in metres, between the two stations.

[3]

Question 9



A car starts from rest and accelerates for u seconds until it reaches a speed of 10 m/s. The car then travels at 10 m/s for $2u$ seconds. The diagram shows the speed-time graph for this journey.

The distance travelled by the car in the first $3u$ seconds is 125 m.

(a) Find the value of u .

[3]

(b) Find the acceleration in the first u seconds.

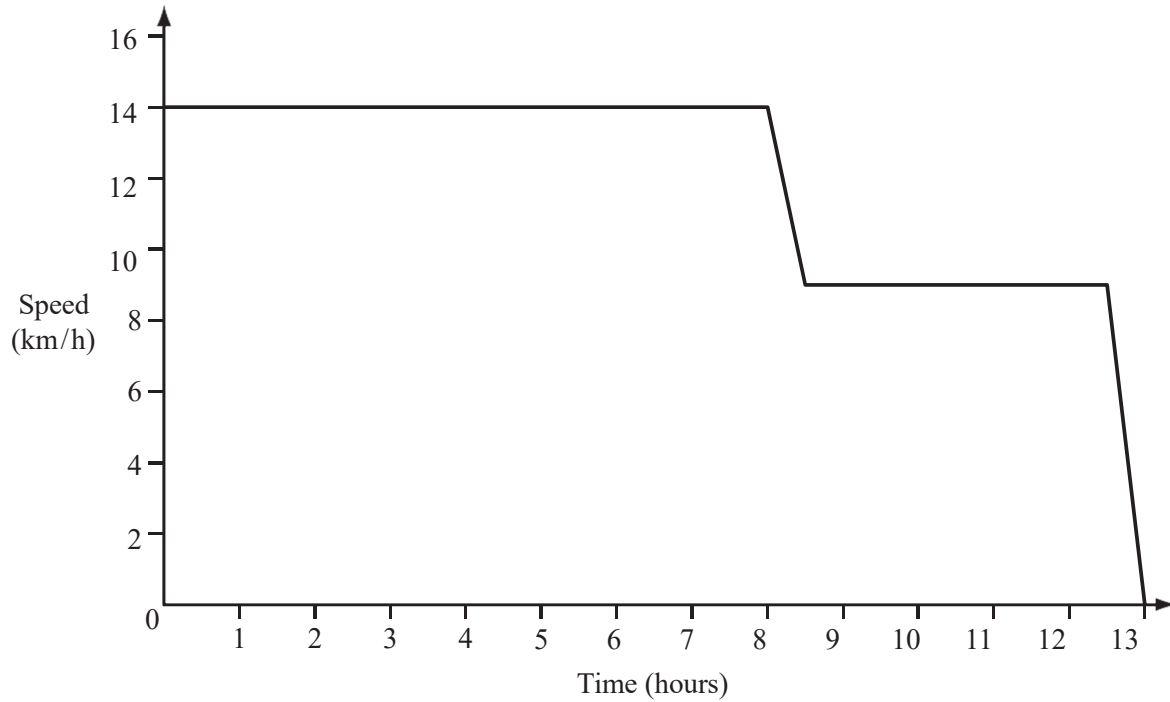
[1]

Question 10

A container ship travelled at 14 km/h for 8 hours and then slowed down to 9 km/h over a period of 30 minutes.

It travelled at this speed for another 4 hours and then slowed to a stop over 30 minutes.

The speed-time graph shows this voyage.



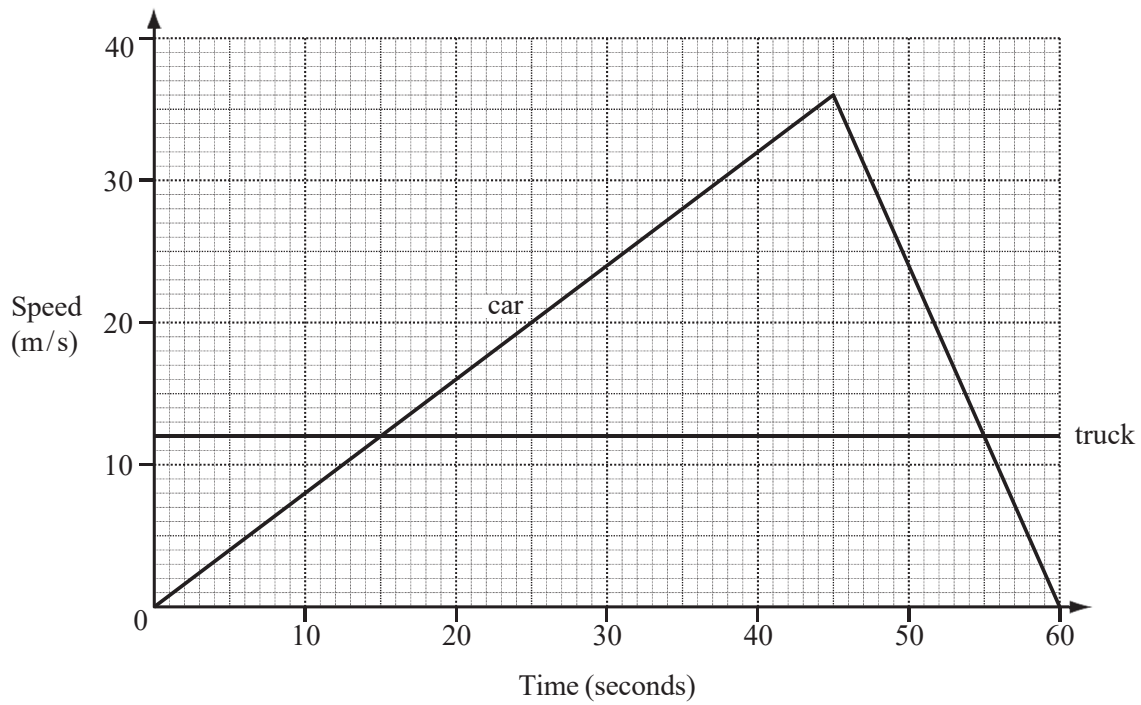
(a) Calculate the total distance travelled by the ship.

[4]

(b) Calculate the average speed of the ship for the whole voyage.

[1]

Question 11



The graph shows the speed of a truck and a car over 60 seconds.

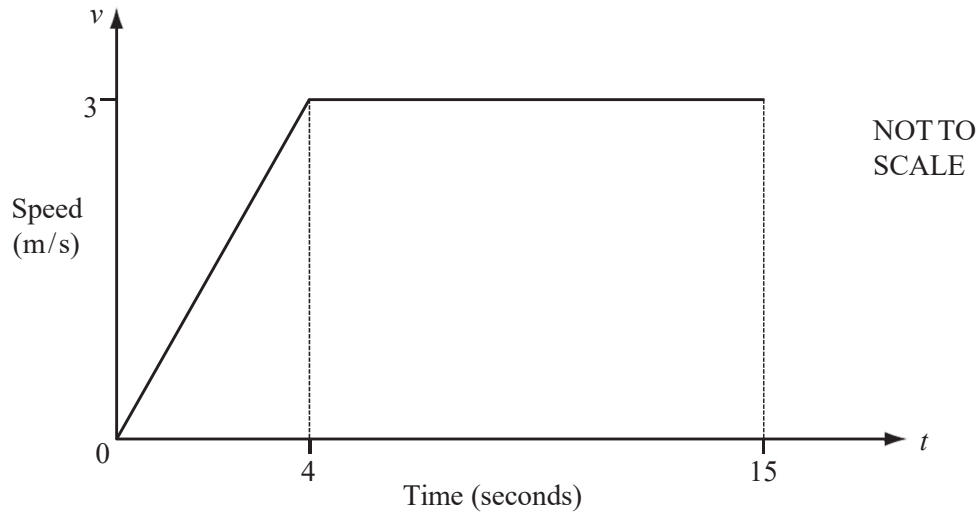
(a) Calculate the acceleration of the car over the first 45 seconds.

[2]

(b) Calculate the distance travelled by the car while it was travelling faster than the truck.

[3]

Question 12

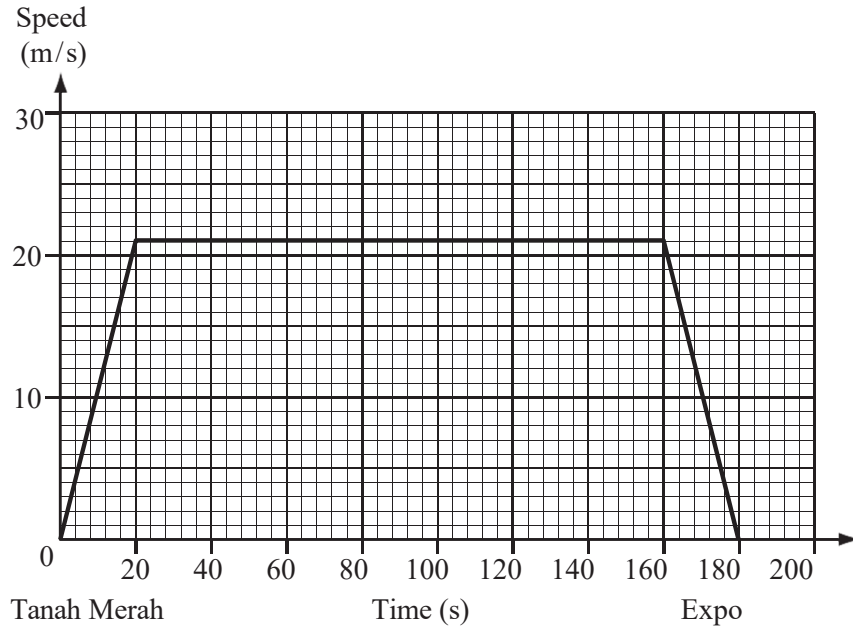


The diagram shows the speed-time graph for 15 seconds of the journey of a cyclist.

(a) Calculate the acceleration of the cyclist during the first 4 seconds. [1]

(b) Calculate the average speed for the first 15 seconds. [3]

Question 13



The graph shows the train journey between Tanah Merah and Expo in Singapore.

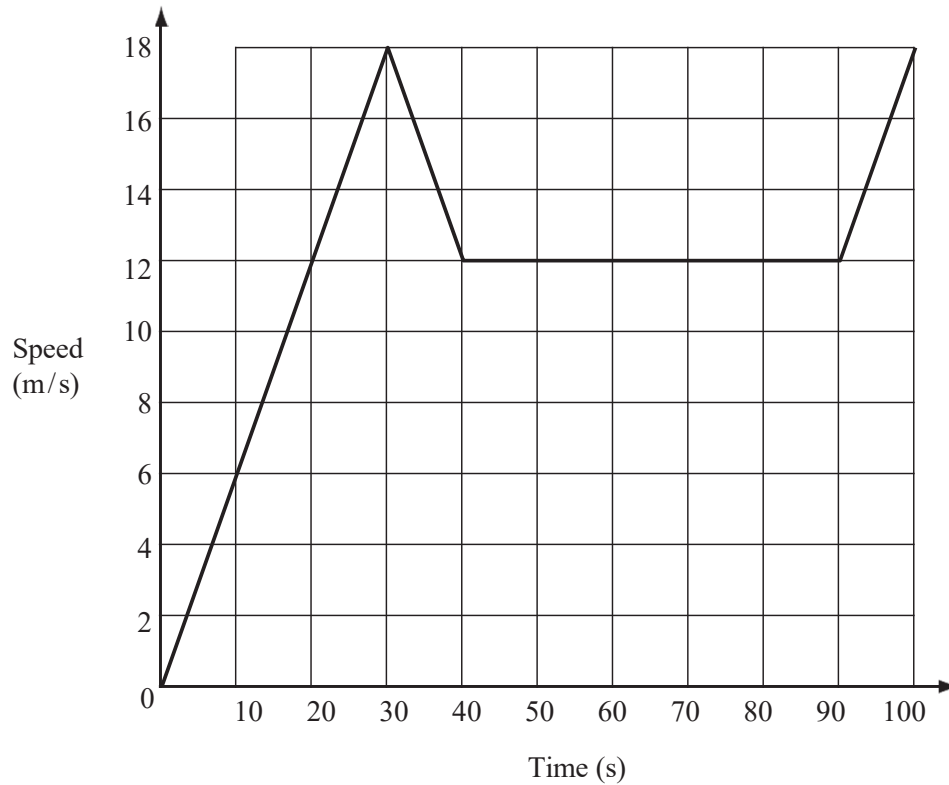
Work out

(a) the acceleration of the train when it leaves Tanah Merah, [2]

(b) the distance between Tanah Merah and Expo, [3]

(c) the average speed of the train for the journey. [1]

Question 14



The diagram shows part of a journey by a truck.

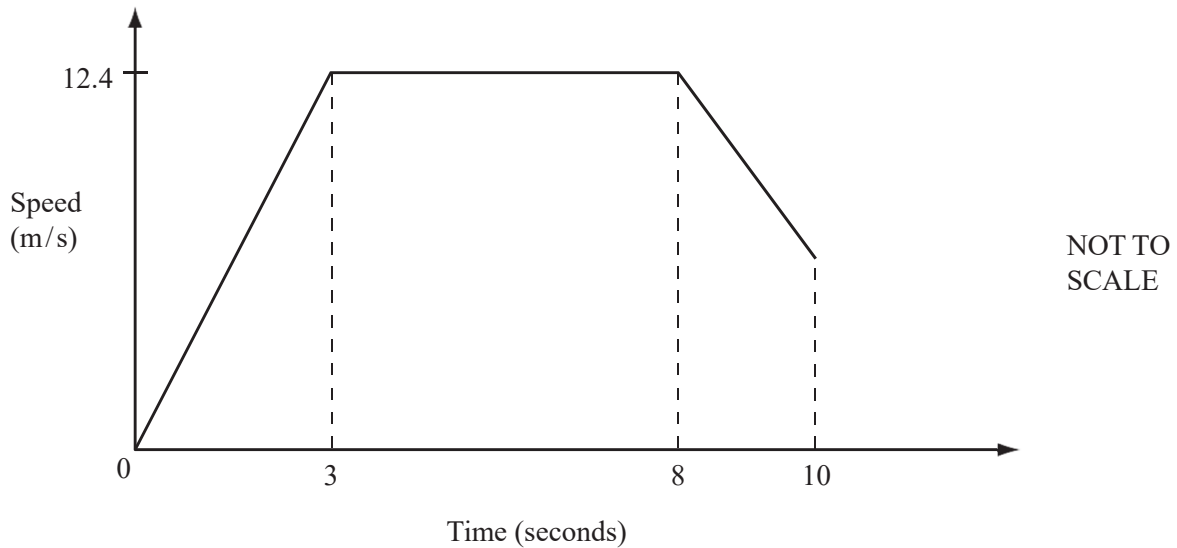
- (a) The truck accelerates from rest to 18 m/s in 30 seconds.
Calculate the acceleration of the truck.

[1]

- (b) The truck then slows down in 10 seconds for some road works and travels through the road works at 12 m/s.
At the end of the road works it accelerates back to a speed of 18 m/s in 10 seconds.
Find the total distance travelled by the truck in the 100 seconds.

[3]

Question 15



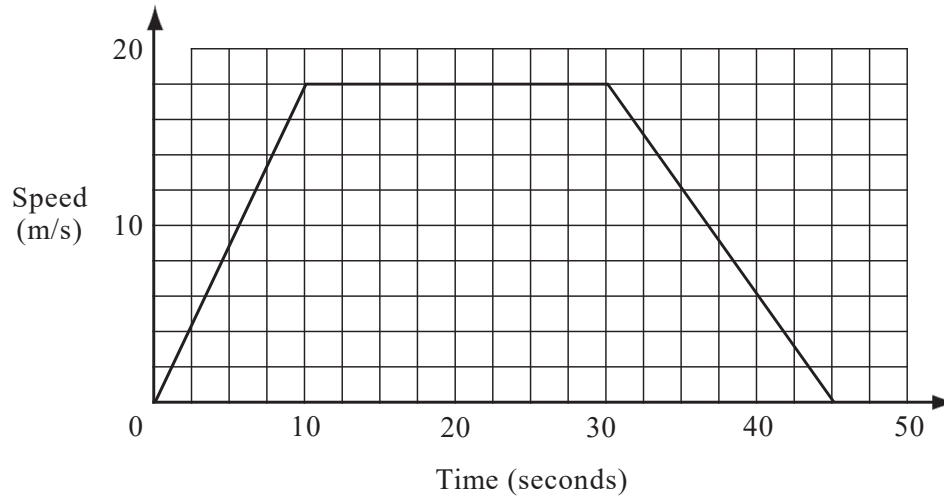
An athlete, in a race, accelerates to a speed of 12.4 metres per second in 3 seconds. He runs at this speed for the next 5 seconds and slows down over the last 2 seconds as shown in the speed-time graph above. He crosses the finish line after 10 seconds. The total distance covered is 100 m.

(a) Calculate the distance he runs in the first 8 seconds. [2]

(b) Calculate his speed when he crosses the finish line. [2]

Question 16

A cyclist is training for a competition and the graph shows one part of the training.

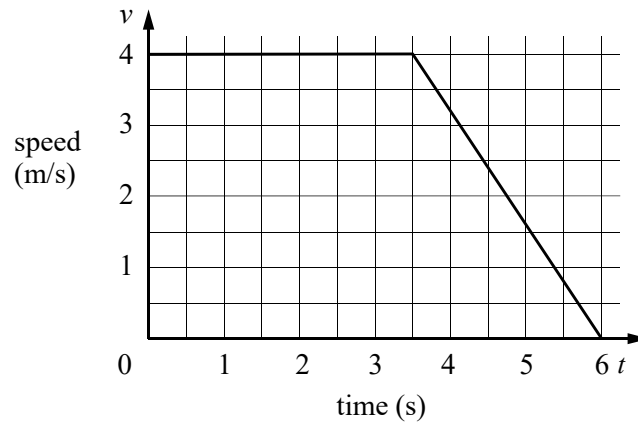


(a) Calculate the acceleration during the first 10 seconds. [2]

(b) Calculate the distance travelled in the first 30 seconds. [2]

(c) Calculate the average speed for the entire 45 seconds. [3]

Question 17



Ameni is cycling at 4 metres per second.
After 3.5 seconds she starts to decelerate and after a further 2.5 seconds she stops. The diagram shows the speed-time graph for Ameni.
Calculate

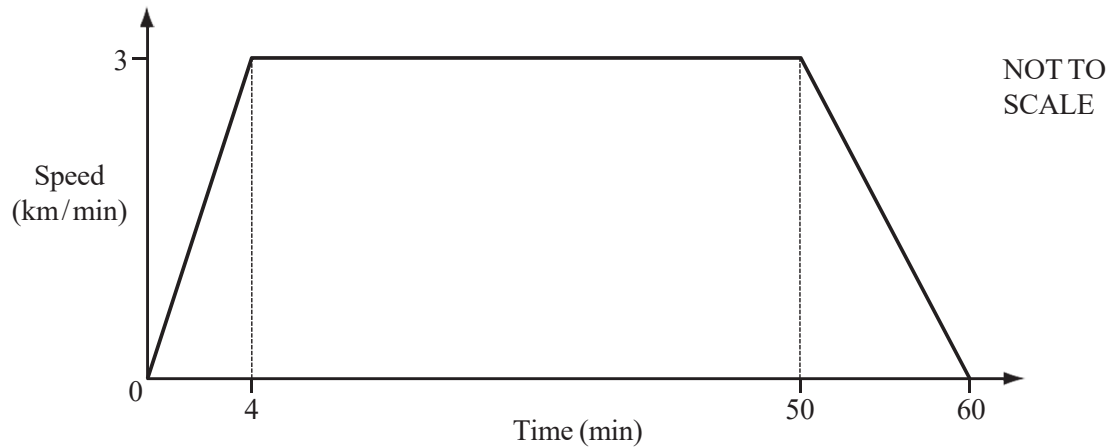
(a) the constant deceleration,

[1]

(b) the total distance travelled during the 6 seconds.

[2]

Question 18



A train journey takes one hour.
The diagram shows the speed-time graph for this journey.

(a) Calculate the total distance of the journey.

Give your answer in kilometres.

[3]

(b) (i) Convert 3 kilometres / minute into metres / second.

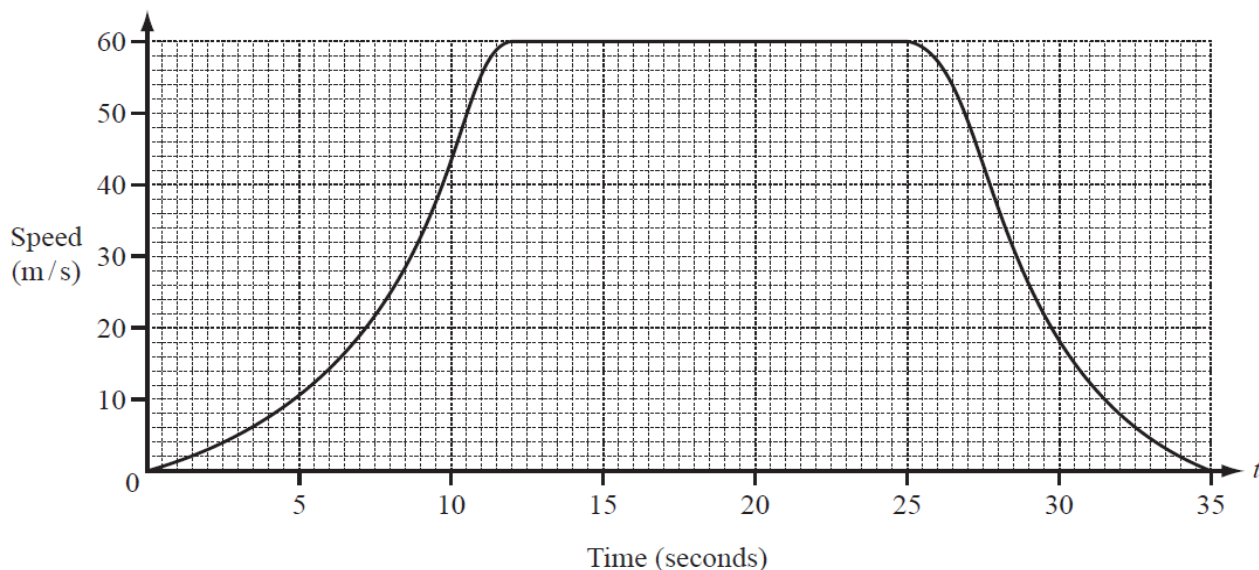
[2]

(ii) Calculate the acceleration of the train during the first 4 minutes.

Give your answer in metres /second².

[2]

Question 19



The graph shows the speed of a sports car after t seconds.

It starts from rest and accelerates to its maximum speed in 12 seconds.

(a) (i) Draw a tangent to the graph at $t = 7$. [1]

(ii) Find the acceleration of the car at $t = 7$.

[2]

(b) The car travels at its maximum speed for 13 seconds.

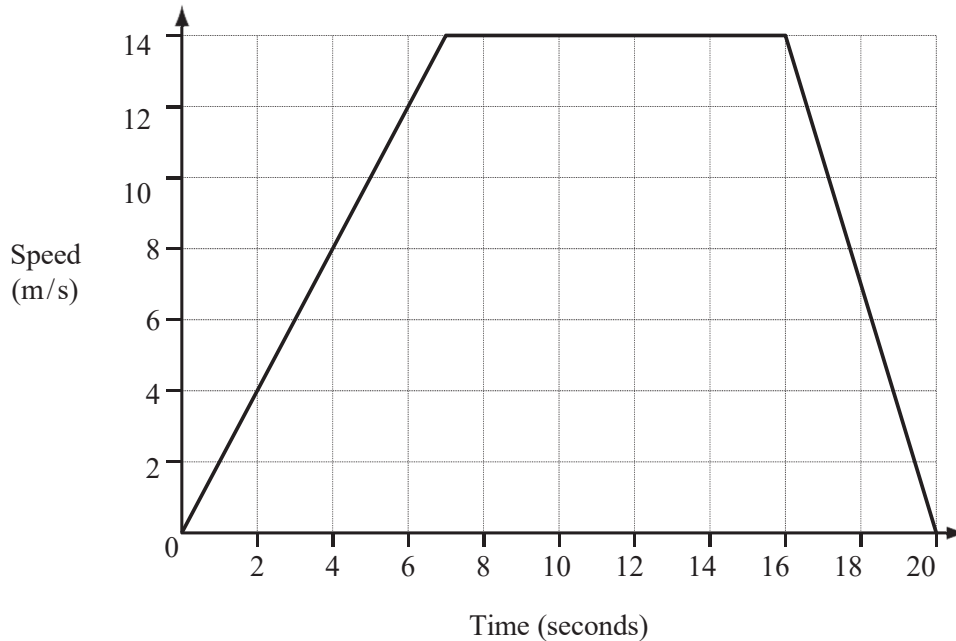
Find the distance travelled by the car at its maximum speed.

[2]

Question 20

An animal starts from rest and accelerates to its top speed in 7 seconds. It continues at this speed for 9 seconds and then slows to a stop in a further 4 seconds.

The graph shows this information.



(a) Calculate its acceleration during the first seven seconds.

[1]

(b) Write down its speed 18 seconds after the start.

[1]

(c) Calculate the total distance that the animal travelled.

[3]

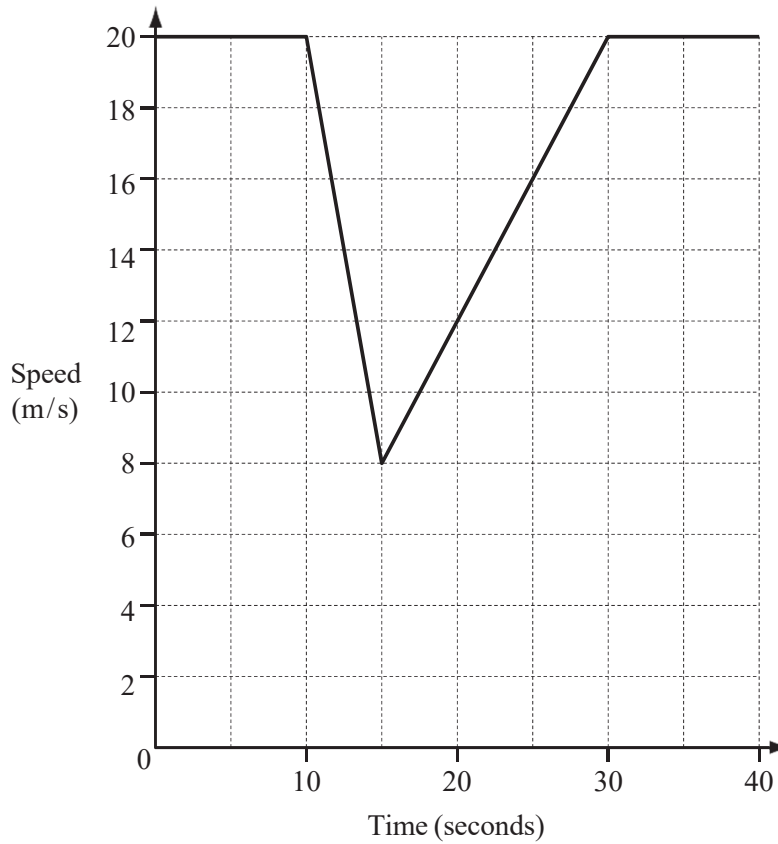


Question 21

Priyantha completes a 10 km run in 55 minutes 20 seconds.
Calculate Priyantha's average speed in km/h.

[3]

Question 22



The graph shows 40 seconds of a car journey.

The car travelled at a constant speed of 20 m/s, decelerated to 8 m/s then accelerated back to 20 m/s.

Calculate

(a) the deceleration of the car,

[1]

(b) the total distance travelled by the car during the 40 seconds.

[3]

Question 23

A person in a car, travelling at 108 kilometres per hour, takes 1 second to go past a building on the side of the road.

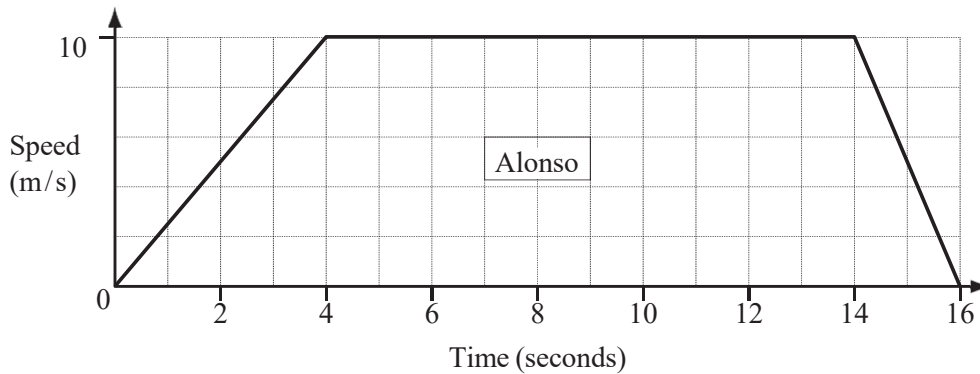
Calculate the length of the building in metres.

[2]

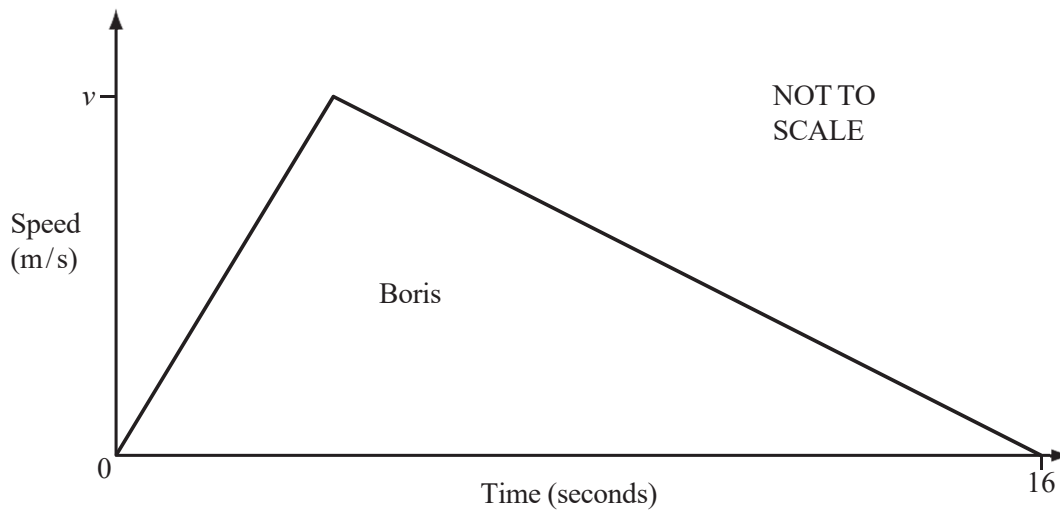
Question 24

The graphs show the speeds of two cyclists, Alonso and Boris.

Alonso accelerated to 10 m/s, travelled at a steady speed and then slowed to a stop.



Boris accelerated to his maximum speed, v m/s, and then slowed to a stop.



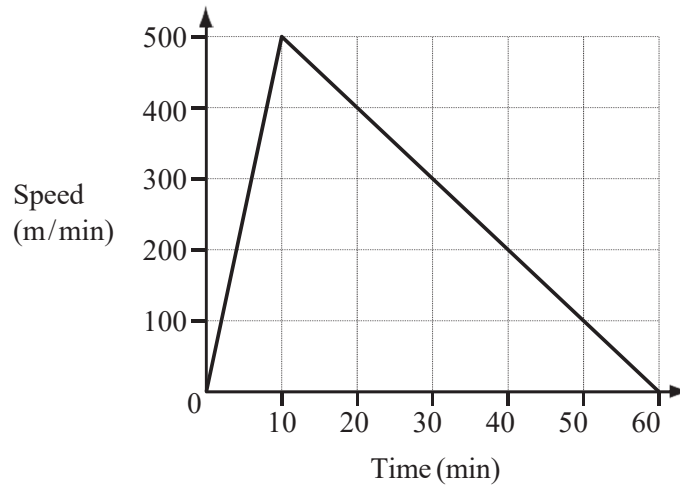
Both cyclists travelled the same distance in the 16 seconds.

Calculate the maximum speed for Boris.

Show all your working.

[5]

Question 25



The diagram shows the speed-time graph for a boat journey.

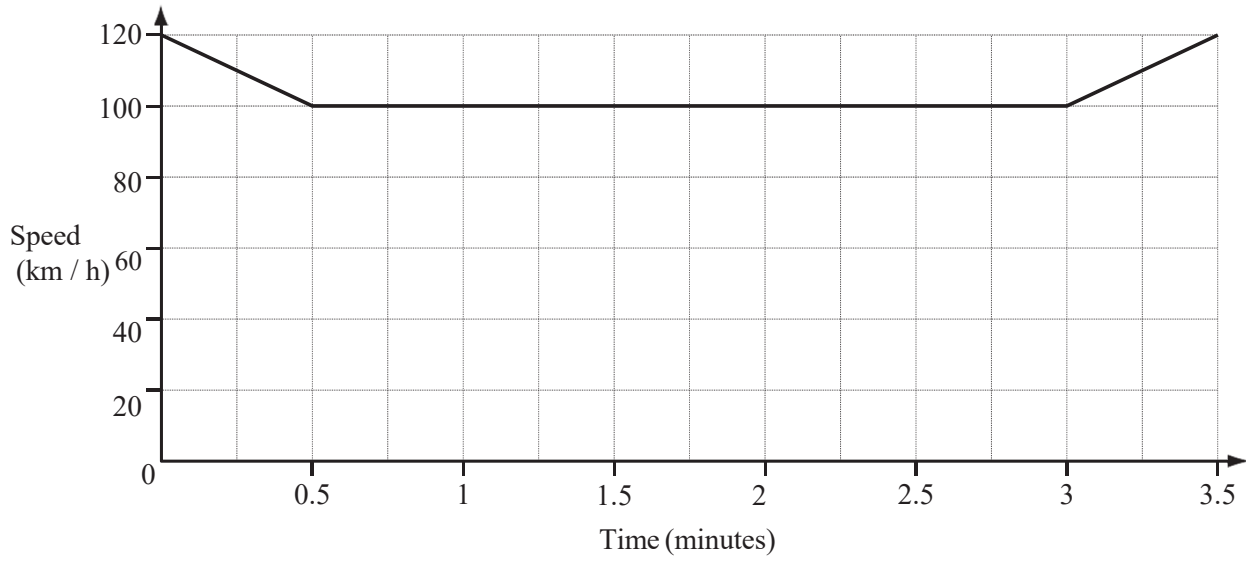
(a) Work out the acceleration of the boat in metres /minute².

[1]

(b) Calculate the total distance travelled by the boat.
Give your answer in **kilometres**.

[2]

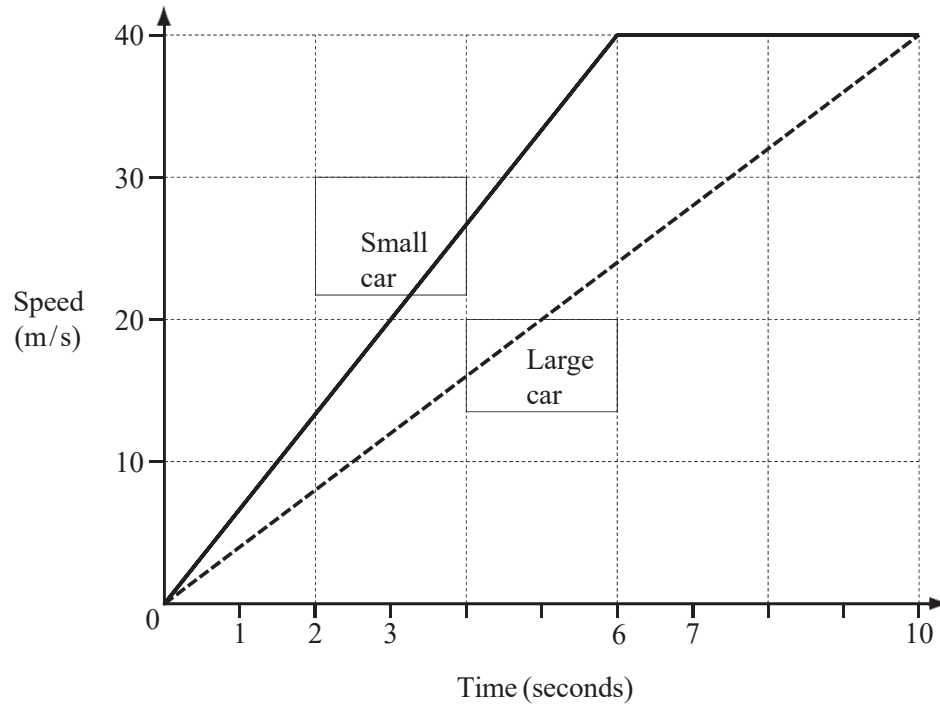
Question 26



The diagram shows the speed-time graph for part of a car journey.
The speed of the car is shown in kilometres/hour.

Calculate the distance travelled by the car during the 3.5 minutes shown in the diagram.
Give your answer in kilometres.

Question 27

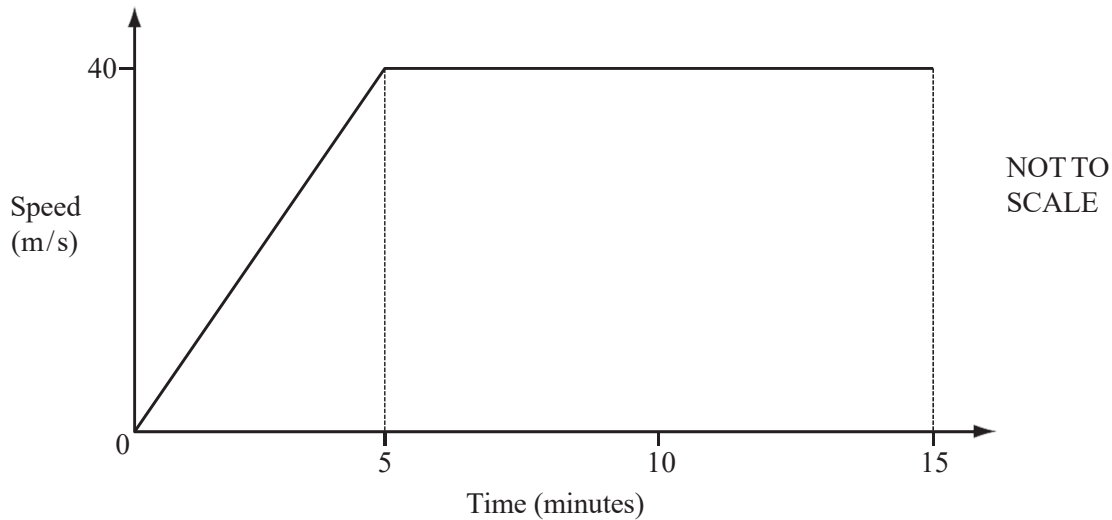


A small car accelerates from 0 m/s to 40 m/s in 6 seconds and then travels at this constant speed.
A large car accelerates from 0 m/s to 40 m/s in 10 seconds.

Calculate how much further the small car travels in the first 10 seconds.

[4]

Question 28



The diagram shows the speed-time graph for the first 15 **minutes** of a train journey. The train accelerates for 5 minutes and then continues at a constant speed of 40 metres/**second**.

- (a) Calculate the acceleration of the train during the first 5 minutes.
Give your answer in m/s^2 .

[2]

- (b) Calculate the average speed for the first 15 minutes of the train journey.
Give your answer in m/s .

[3]

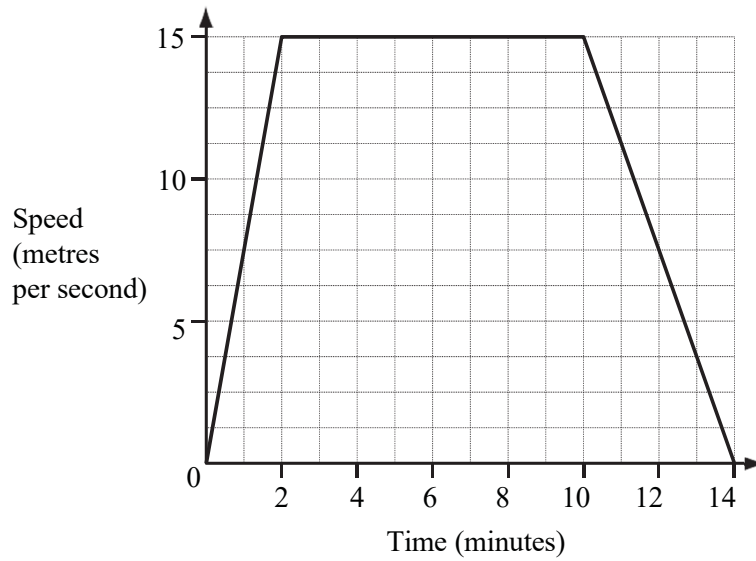
Question 29

A train leaves Barcelona at 21 28 and takes 10 hours and 33 minutes to reach Paris.

(a) Calculate the time the next day when the train arrives in Paris. [1]

(b) The distance from Barcelona to Paris is 827 km.

Calculate the average speed of the train in kilometres per hour. [3]



The diagram shows the speed-time graph of a train journey between two stations.
The train accelerates for two minutes, travels at a constant maximum speed, then slows to a stop.

(a) Write down the number of seconds that the train travels at its constant maximum speed. [1]

(b) Calculate the distance between the two stations in metres. [3]

(c) Find the acceleration of the train in the first two minutes.
Give your answer in m/s^2 . [2]

Question 31

A train takes 65 minutes to travel 52 km.

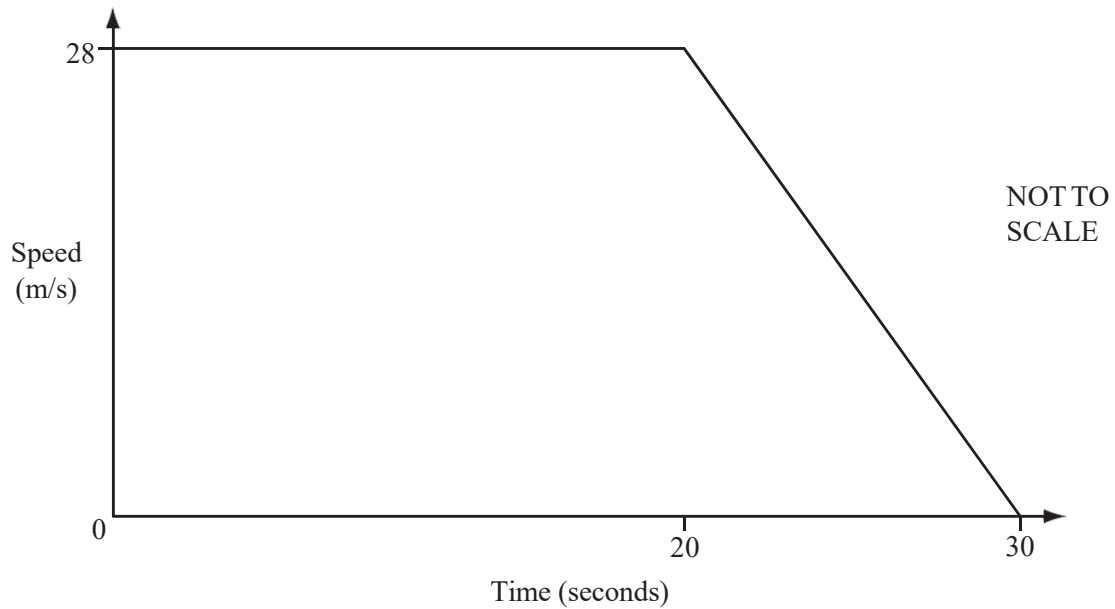
Calculate the average speed of the train in kilometres per hour. [2]

(a) Convert 144km/h into metres per second. [2]

(b) A train of length 120 m is travelling at 144km/h.
It passes under a bridge of width 20 m.

Find the time taken for the whole train to pass under the bridge.
Give your answer in seconds. [2]

Question 32

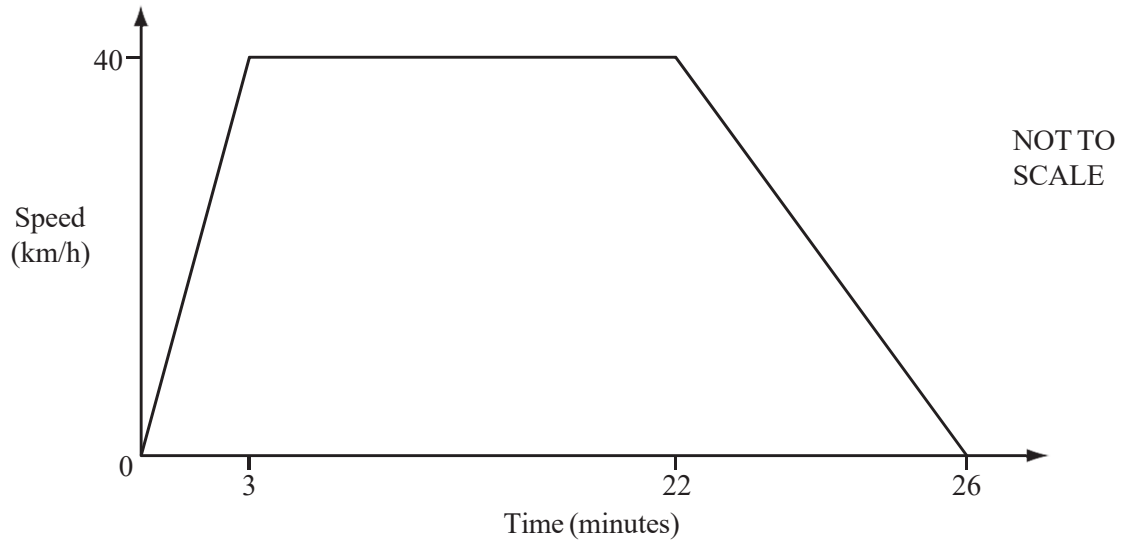


The diagram shows the speed-time graph of a car.
It travels at 28m/s for 20 seconds and then decelerates until it stops after a further 10 seconds.

(a) Calculate the deceleration of the car. [1]

(b) Calculate the distance travelled during the 30 seconds. [3]

Question 33



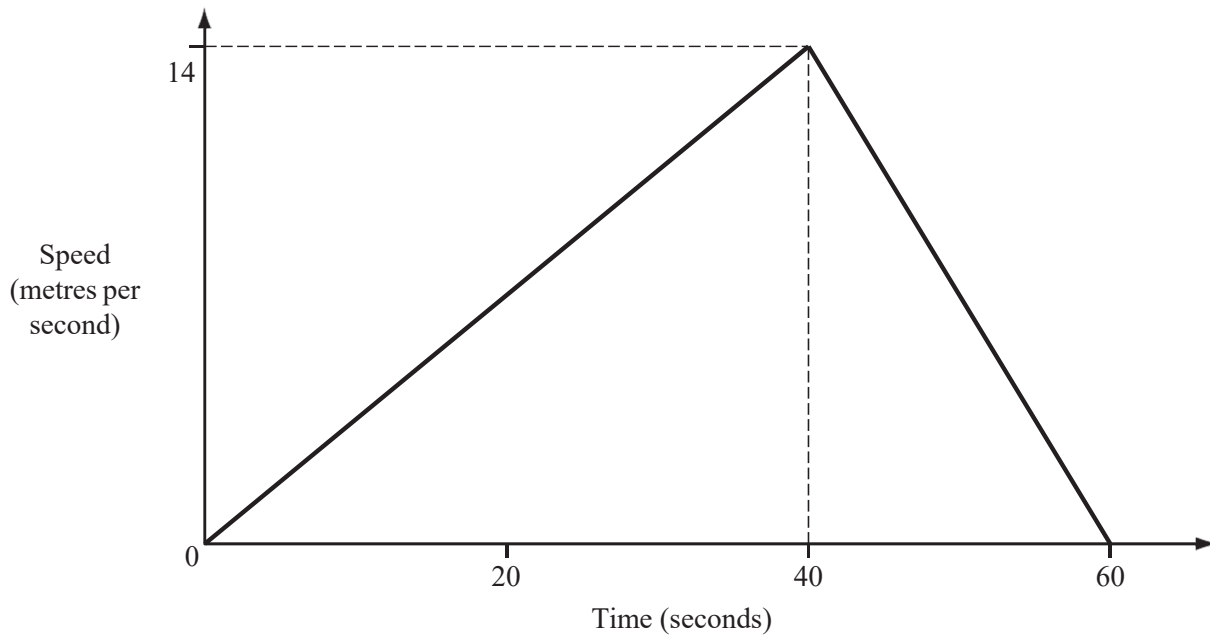
The diagram shows the speed-time graph of a train journey between two stations.

The train accelerates for 3 minutes, travels at a constant maximum speed of 40 km/h, then takes 4 minutes to slow to a stop.

Calculate the distance in kilometres between the two stations.

[4]

Question 34

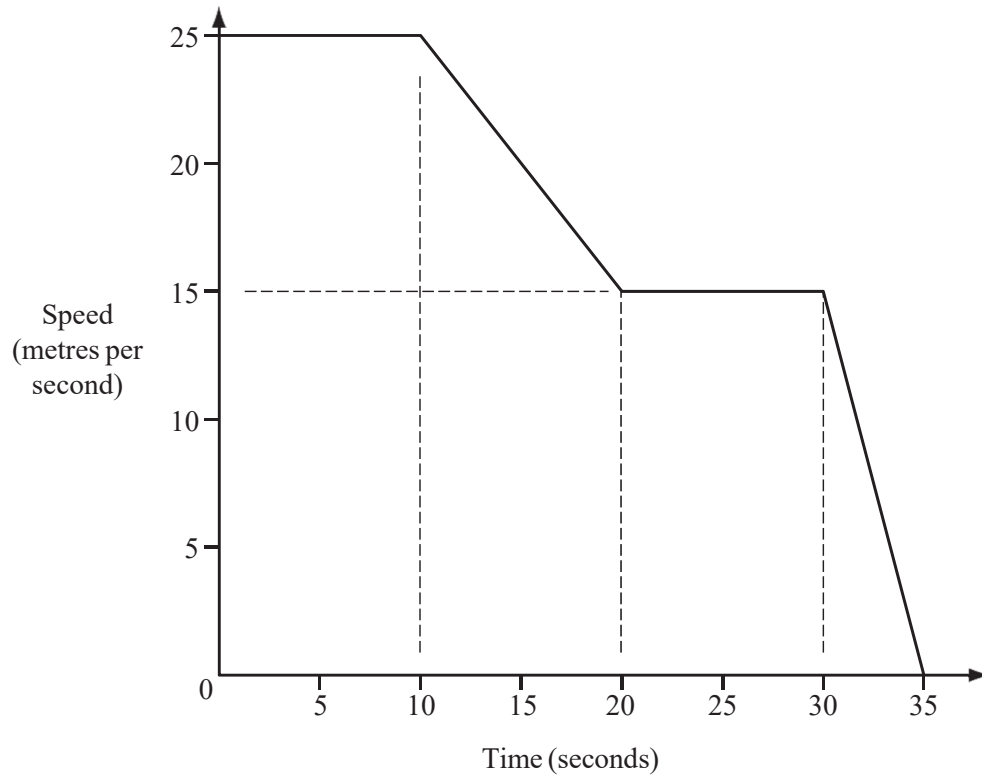


The diagram shows the speed-time graph of a bus journey between two bus stops.
Hamid runs at a constant speed of 4 m/s along the bus route.
He passes the bus as it leaves the first bus stop.
The bus arrives at the second bus stop after 60 seconds.

How many metres from the bus is Hamid at this time?

[3]

Question 35



The diagram shows the speed-time graph for the last 35 seconds of a car journey.

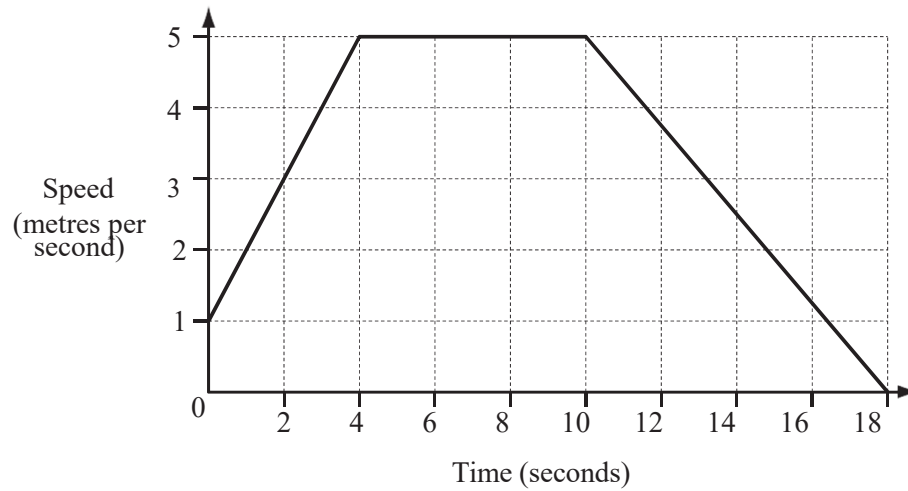
(a) Find the deceleration of the car as it came to a stop.

[1]

(b) Calculate the total distance travelled by the car in the 35 seconds.

[3]

Question 36



The diagram shows the speed-time graph for the last 18 seconds of Roman's cycle journey.

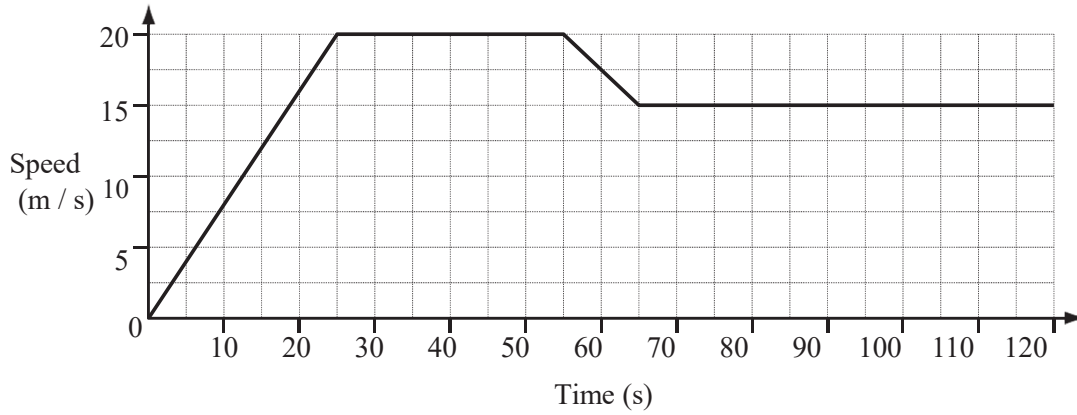
(a) Calculate the deceleration.

[1]

(b) Calculate the total distance Roman travels during the 18 seconds.

[3]

Question 37



The diagram shows the speed-time graph for the first 120 seconds of a car journey.

(a) Calculate the acceleration of the car during the first 25 seconds.

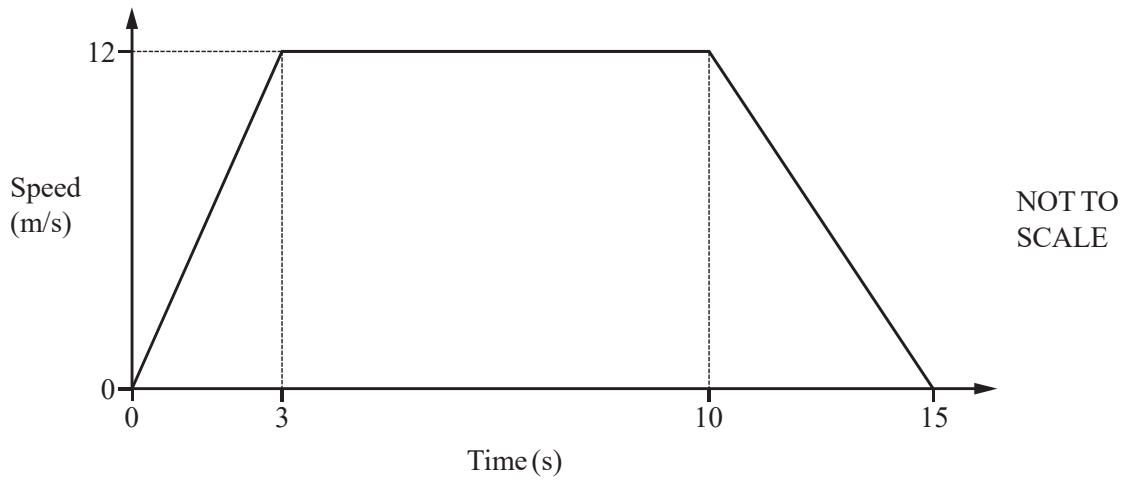
[1]

(b) Calculate the distance travelled by the car in the first 120 seconds.

[4]



Question 38



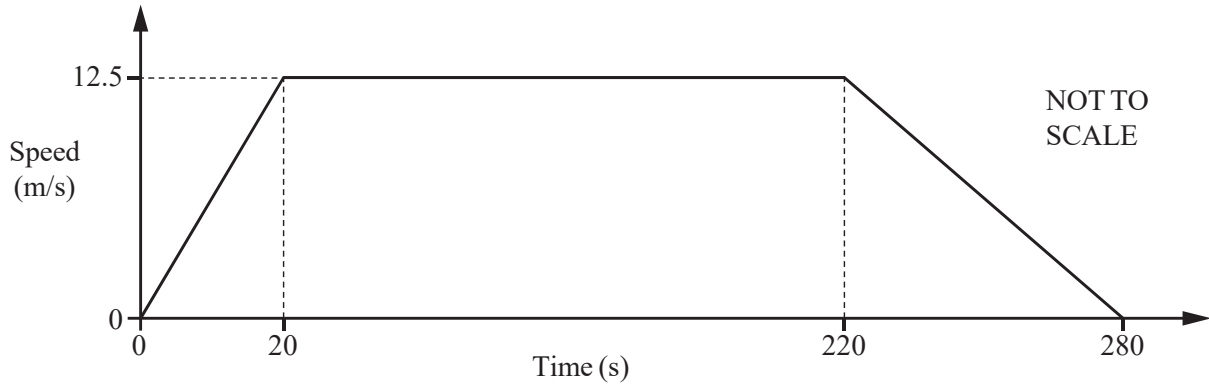
The diagram shows a speed-time graph.

Calculate the total distance travelled.

[3]

Question 39

The diagram shows a speed-time graph for the journey of a car.

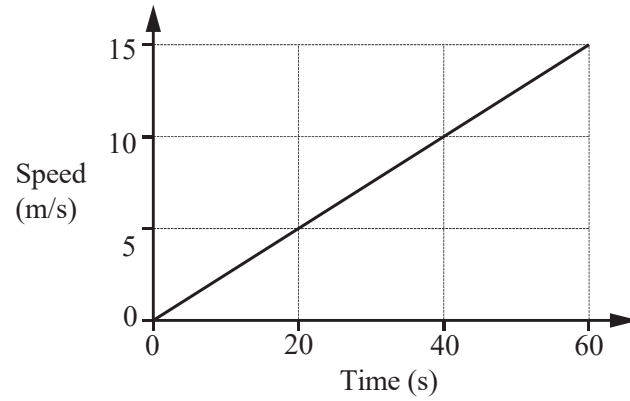


Calculate the total distance travelled.

[3]

Question 40

The speed-time graph shows the first 60 seconds of a train journey.



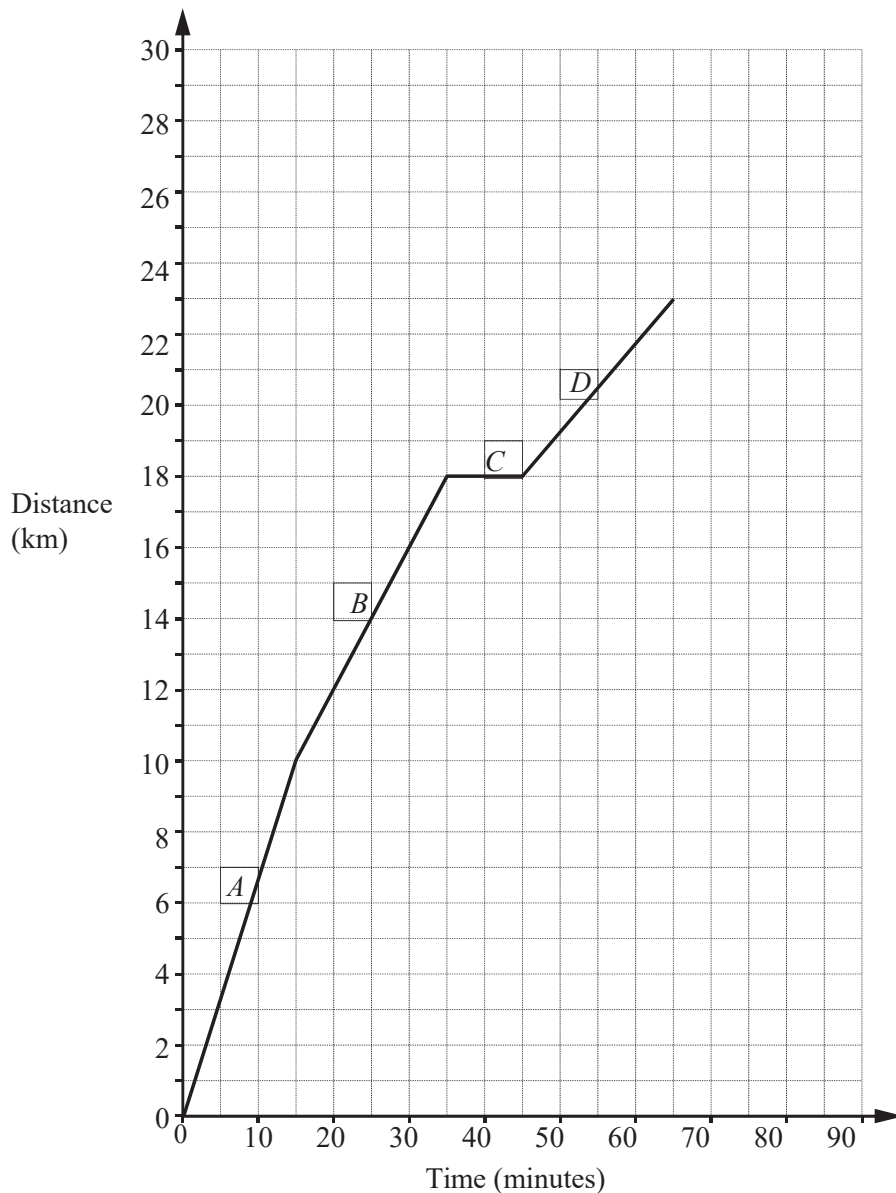
(a) Find the acceleration of the train.

[1]

(b) Calculate the distance the train has travelled in this time.
Give your answer in kilometres.

[3]

Question 41



The diagram shows the distance-time graph for the first 65 minutes of a bicycle journey.

(a) There are four different parts to the journey labelled *A*, *B*, *C* and *D*.

Write down the part of the journey with the fastest speed.

[1]

(b) After the first 65 minutes the bicycle travels at a constant speed of 20 km/h for 15 minutes.

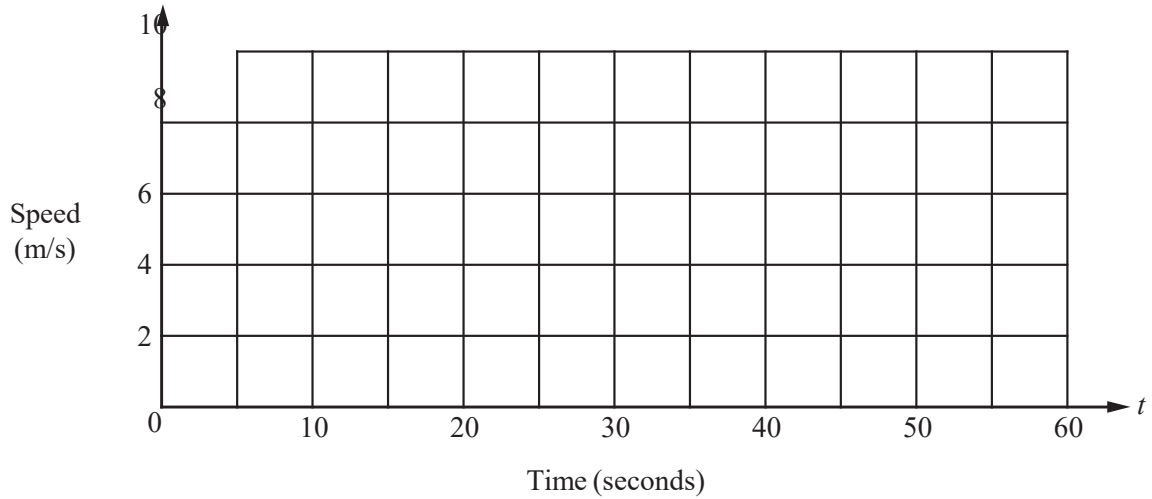
Draw this part of the journey on the diagram.

[1]

Question 42

A car passes through a checkpoint at time $t = 0$ seconds, travelling at 8 m/s.
It travels at this speed for 10 seconds.
The car then decelerates at a constant rate until it stops when $t = 55$ seconds.

(a) On the grid, draw the speed-time graph.



[2]

(b) Calculate the total distance travelled by the car after passing through the checkpoint.

[3]

Question 43

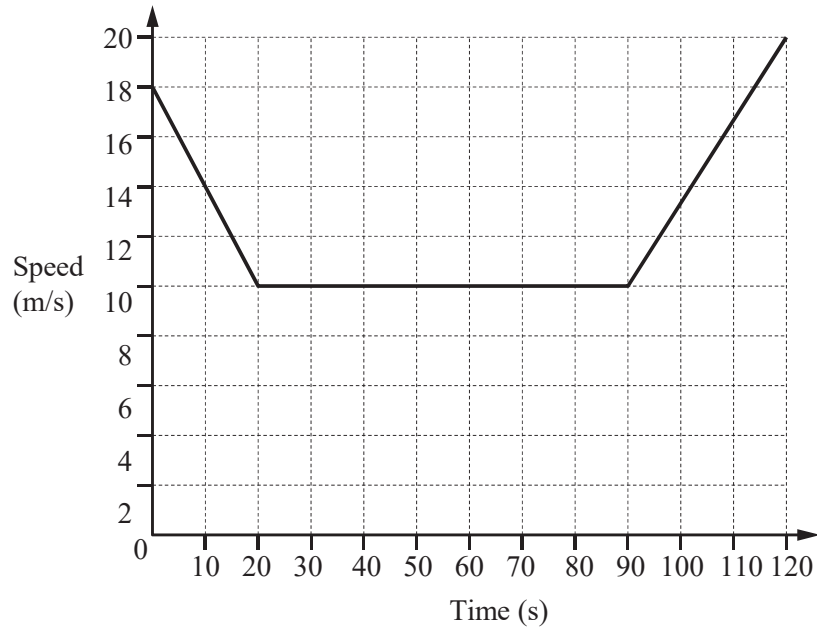
A car travels a distance of 1280 **metres** at an average speed of 64 kilometres per hour.

Calculate the time it takes for the car to travel this distance.

Give your answer in **seconds**.

[3]

Question 44



The diagram shows the speed-time graph for 120 seconds of a car journey.

(a) Calculate the deceleration of the car during the first 20 seconds.

[1]

(b) Calculate the total distance travelled by the car during the 120 seconds.

[3]

(c) Calculate the average speed for this 120 second journey.

[1]

Question 45

Fritz drives a distance of 381 km in 2 hours and 18 minutes.
He then drives 75 km at a constant speed of 30 km/h.

Calculate his average speed for the whole journey.

[4]