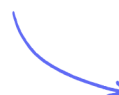


Real-Life Graphs

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

Easy (8 questions)	/29
Medium (17 questions)	/66
Hard (16 questions)	/86
Total Marks	/181

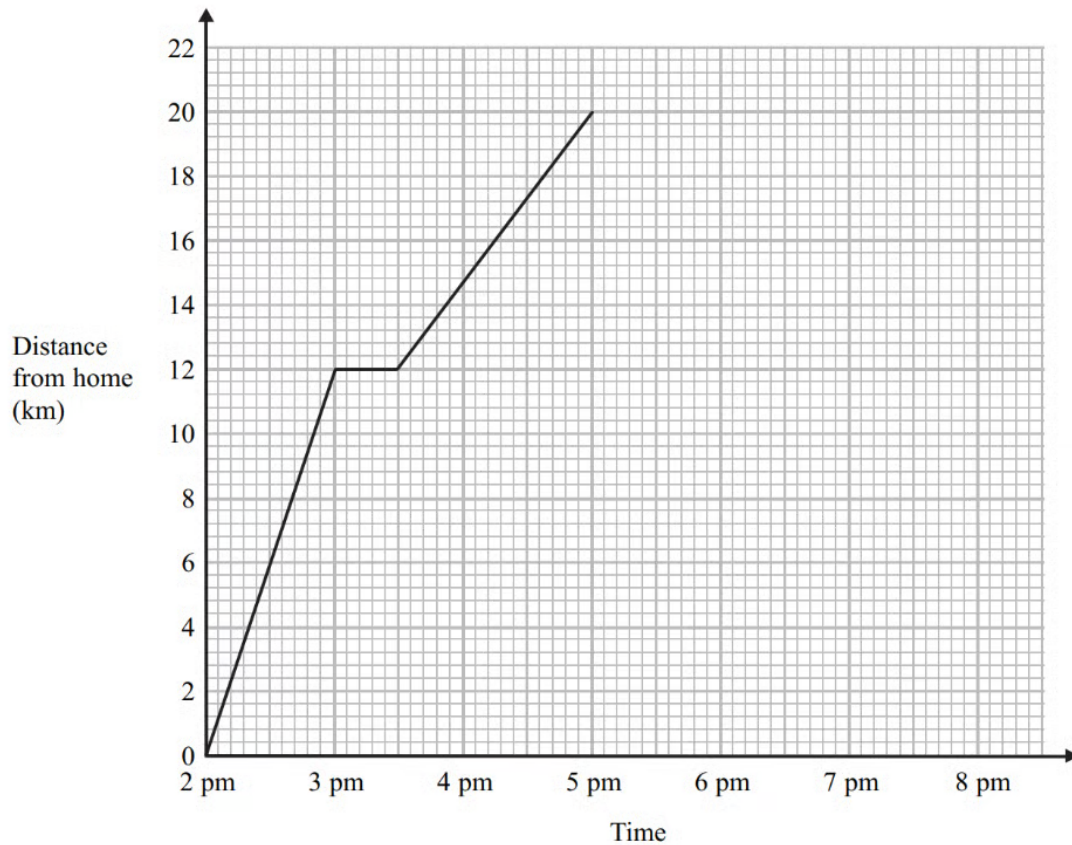
Scan here to return to the course
or visit [savemyexams.com](https://www.savemyexams.com)



Easy Questions

- 1 (a)** 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.

How many minutes did he rest?

(1 mark)

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

(1 mark)

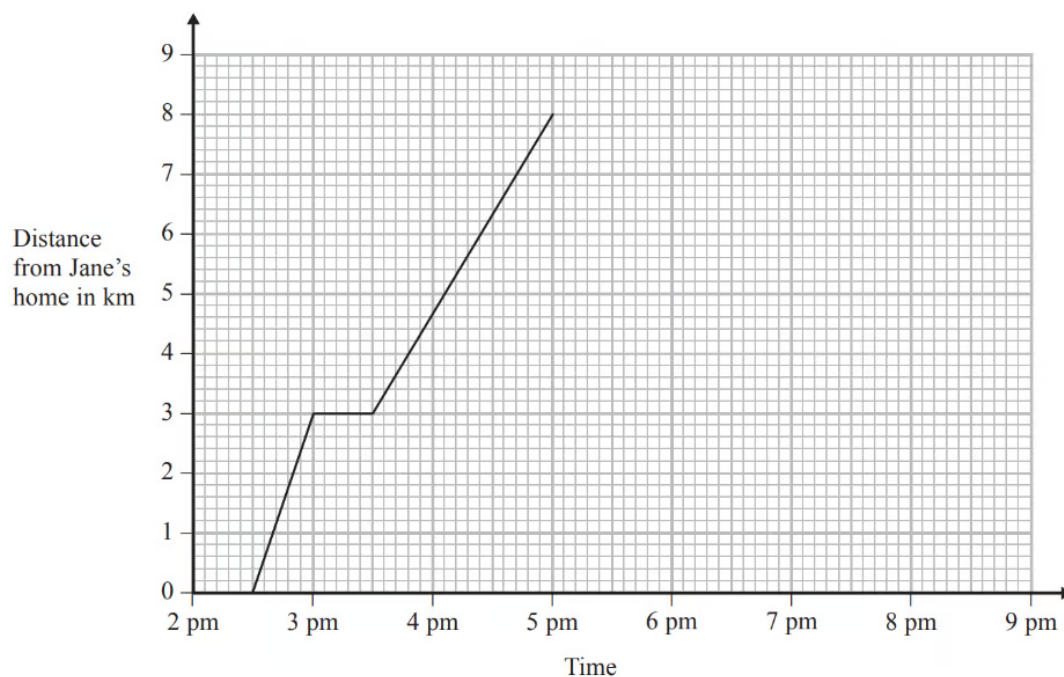
- (c) At 5 pm Simon stopped for 30 minutes.
Then he cycled home at a steady speed.
It took him 1 hour 30 minutes to get home.

Complete the travel graph.

(2 marks)

2 (a) Jane walked from her home to the ice rink.

The travel graph for Jane's journey to the ice rink is shown below.



On the way to the ice rink Jane stopped at her friend's house.

How far is it from her friend's house to the ice rink?

(1 mark)

(b) Jane was at the ice rink for 1 hour 30 minutes.

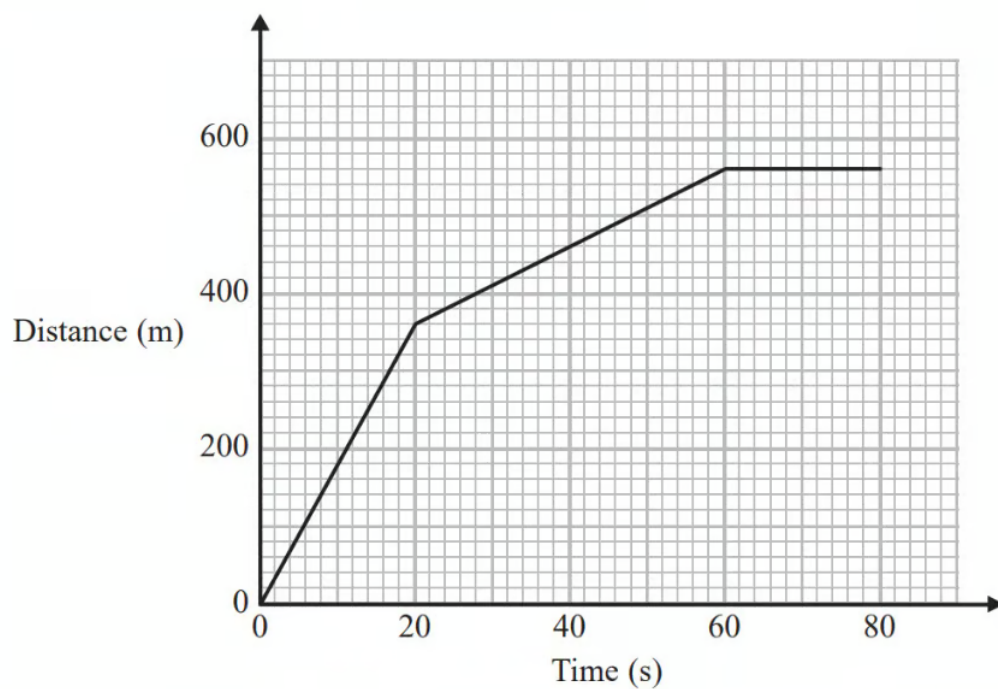
She then walked home at a steady speed.

Jane took 2 hours to walk home.

Complete the travel graph for this information.

(2 marks)

3 (a) Here is part of a distance-time graph for a car's journey.



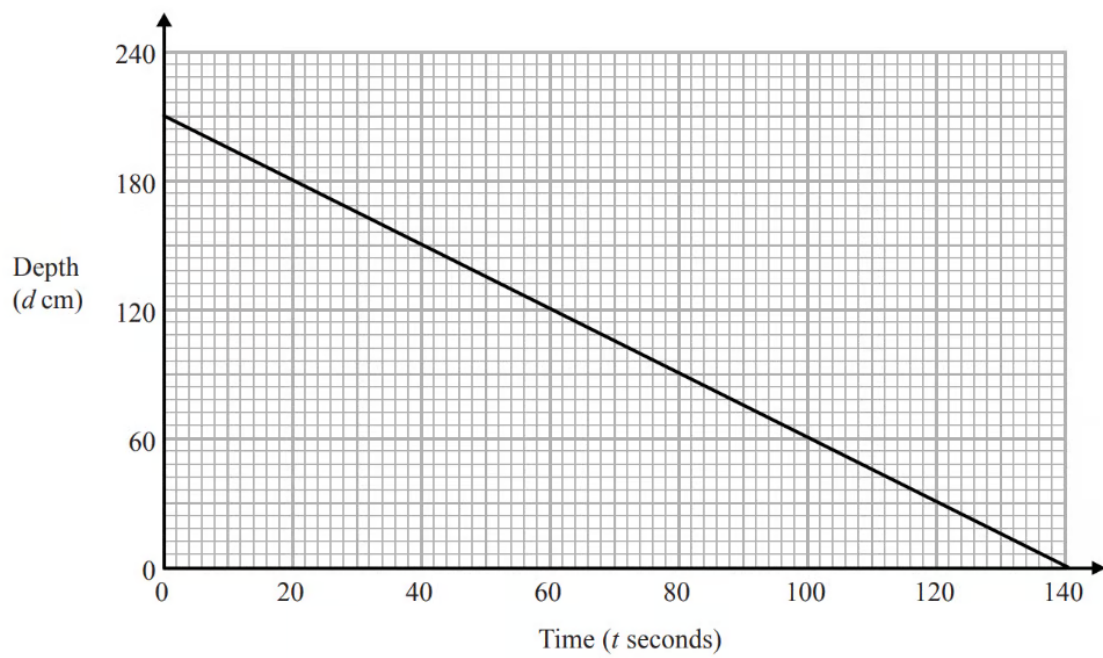
Between which two times does the car travel at its greatest speed?
Give a reason for your answer.

(2 marks)

(b) Work out this greatest speed.

(1 mark)

4 (a) The graph shows the depth, d cm, of water in a tank after t seconds.



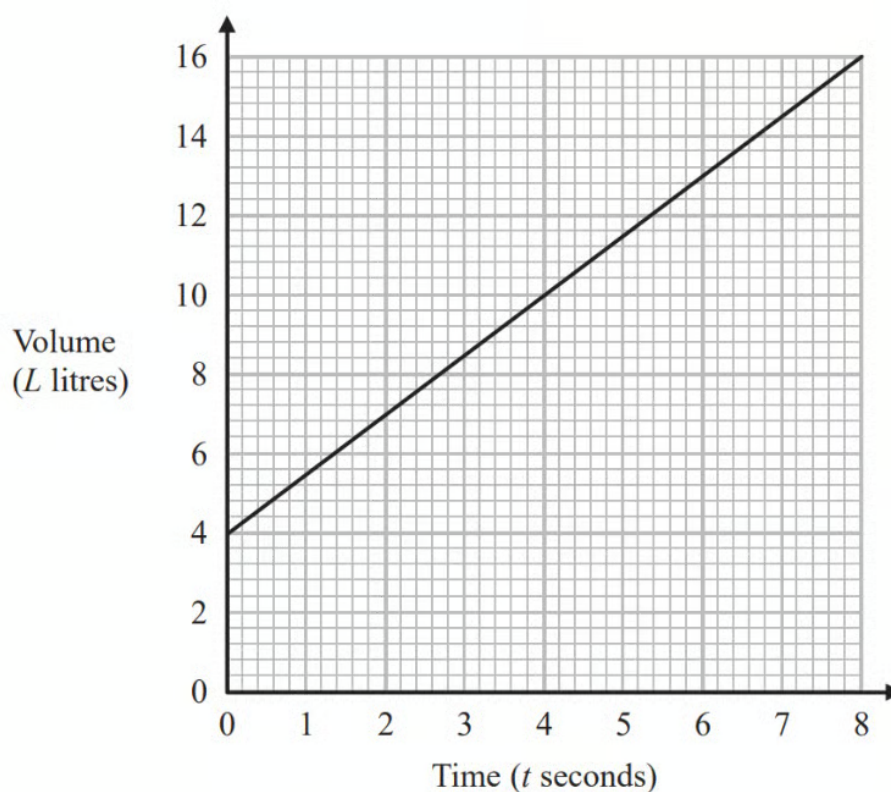
Find the gradient of this graph.

(2 marks)

(b) Explain what this gradient represents.

(1 mark)

5 (a) The graph shows the volume of liquid (L litres) in a container at time t seconds.



Find the gradient of the graph.

(2 marks)

(b) Explain what this gradient represents.

(1 mark)

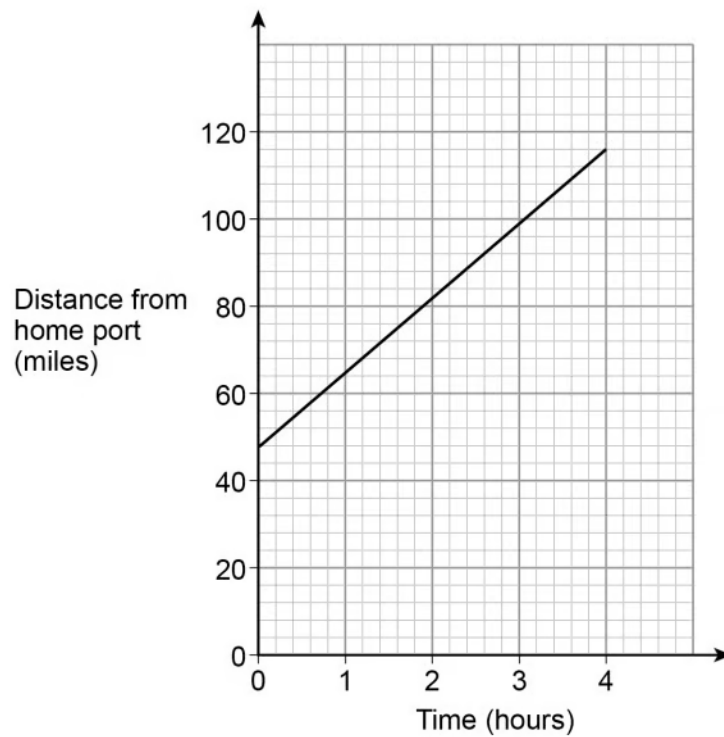
(c) The graph intersects the volume axis at $L = 4$

Explain what this intercept represents.

(1 mark)

6 A ship is sailing in a straight line from its home port.

The distance-time graph shows 4 hours of the journey.

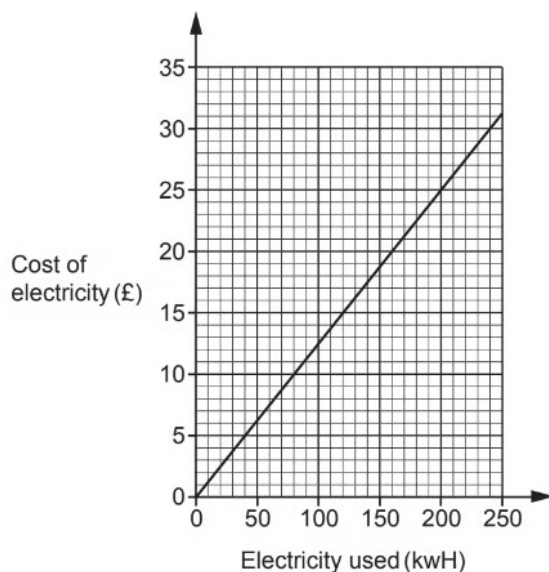


Work out the speed of the ship during these 4 hours.

.....mph

(3 marks)

7 (a) The graph shows the cost of electricity with Company A.



Use the information in the graph to estimate the cost of electricity for a customer who uses 450kWh of electricity.

£

(3 marks)

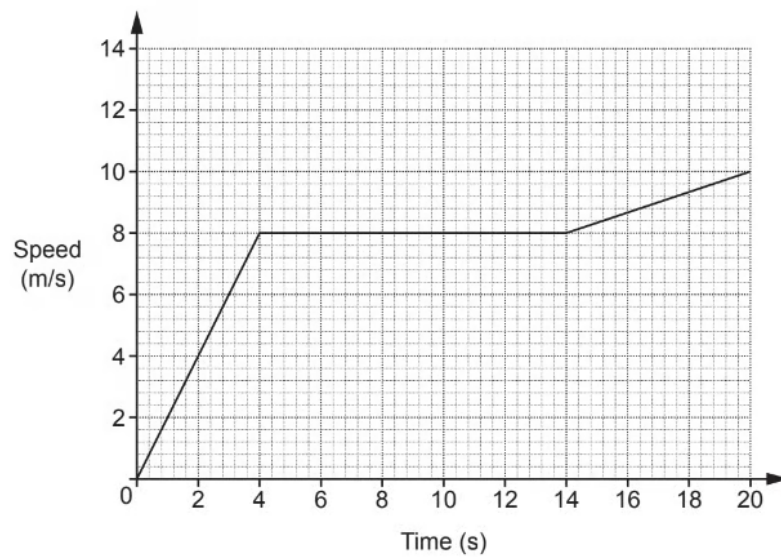
(b) Company B charges 14.3 pence per kWh of electricity used.

If Company B's cost of electricity was plotted on the same axes as Company A's cost of electricity, which line would be steeper? Explain how you know.

Company would have the steeper line because

(3 marks)

8 The graph shows the speed of a cyclist during 20 seconds of a journey.



Find the acceleration of the cyclist

i) for the first 4 seconds

.....m/s² [2]

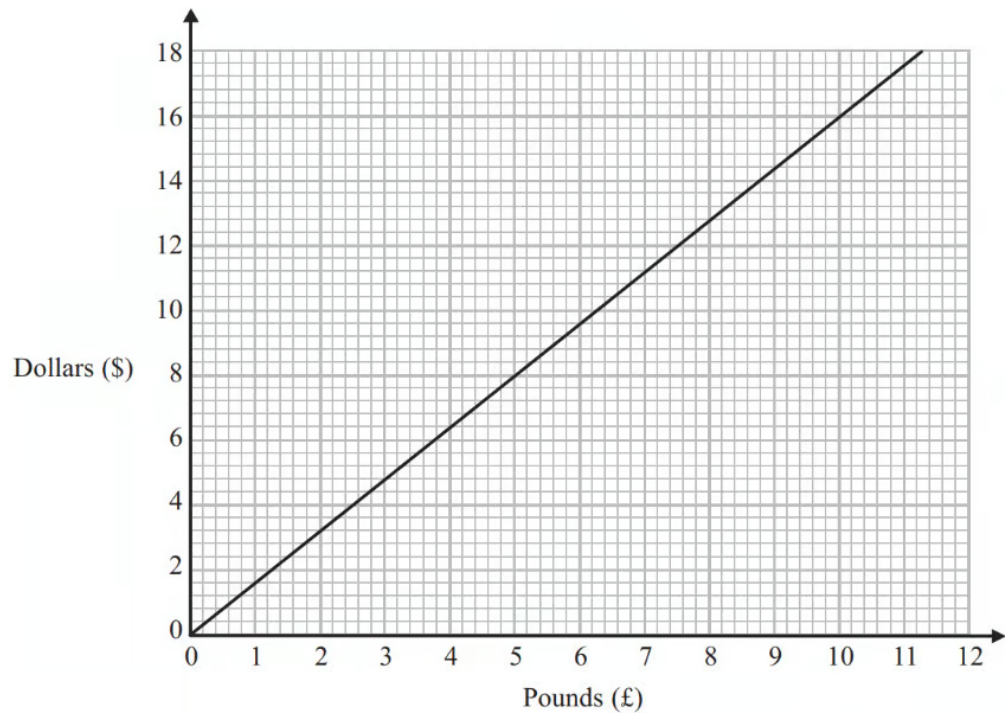
ii) between 4 seconds and 14 seconds.

.....m/s² [1]

(3 marks)

Medium Questions

1 (a) You can use this conversion graph to change between pounds (£) and dollars (\$).



Use the conversion graph to change £5 to dollars.

(1 mark)

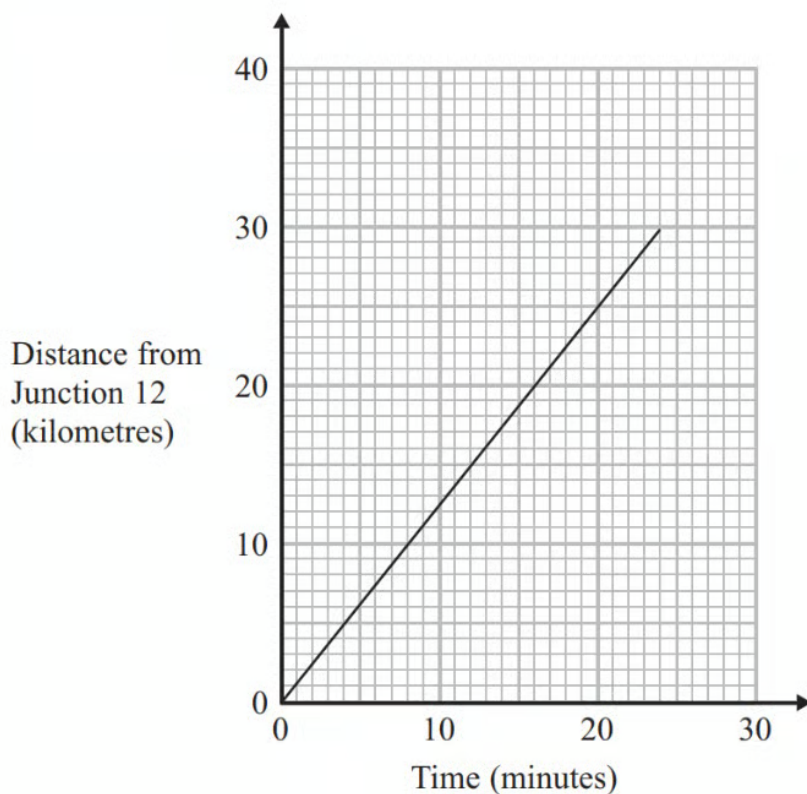
(b) Ella has \$200 and £800
Her hotel bill is \$600

Ella pays the bill with the \$200 and some of the pounds.

Use the conversion graph to work out how many pounds she has left.

(4 marks)

- 2 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.

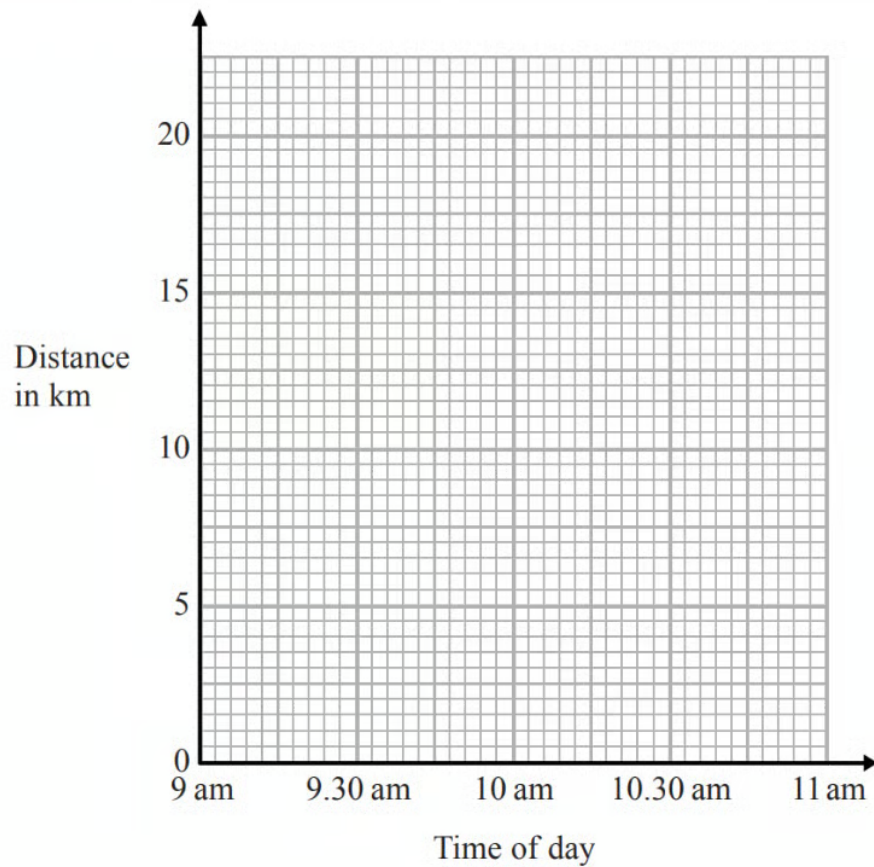
Who had the faster average speed, Debbie or Ian?
You must explain your answer.

(4 marks)

- 3 (a) At 9 am, Bradley began a journey on his bicycle.

From 9 am to 9.36 am, he cycled at an average speed of 15 km/h From 9.36 am to 10.45 am, he cycled a further 8 km.

Draw a travel graph to show Bradley's journey.



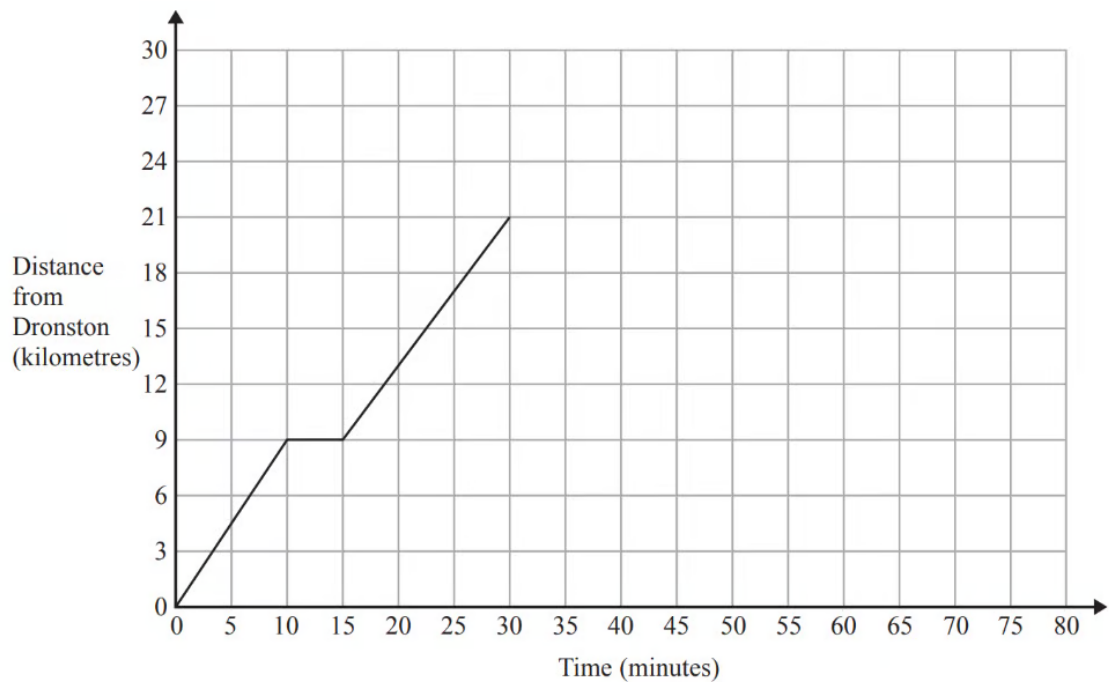
(3 marks)

(b) From 10.45 am to 11 am, Bradley cycled at an average speed of 18 km/h.

Work out the distance Bradley cycled from 10.45 am to 11 am.

(2 marks)

- 4 (a)** A coach travels from Dronston to Luscoe.
The travel graph for this journey is shown below.



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

(2 marks)

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

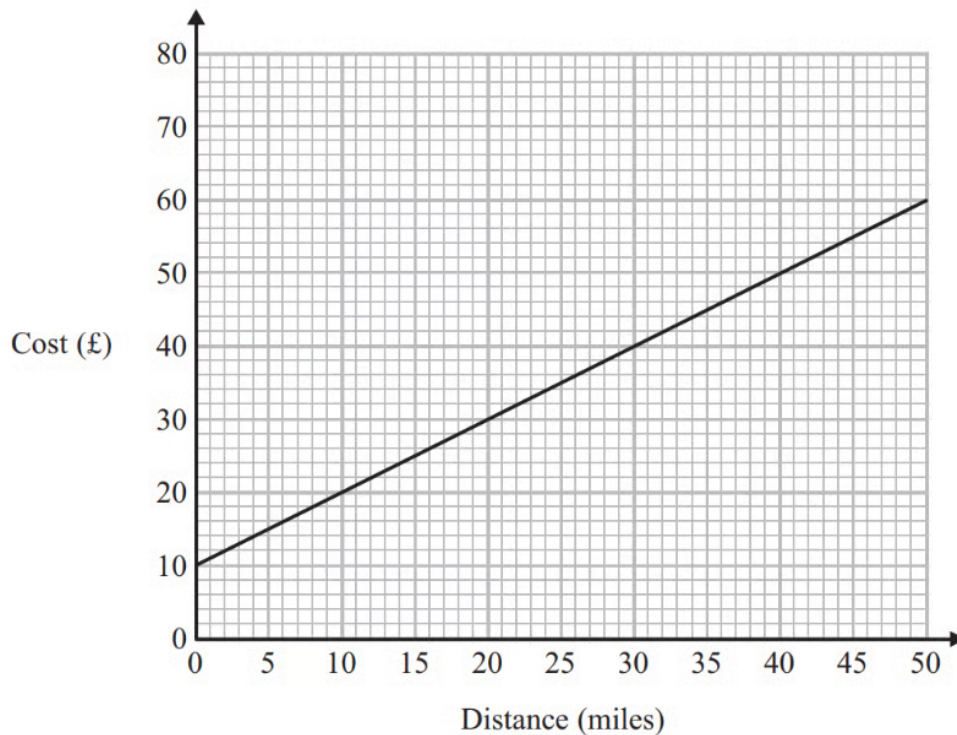
Show this information on the travel graph.

(3 marks)

5 (a) Bill uses his van to deliver parcels.

For each parcel Bill delivers there is a fixed charge plus £1.00 for each mile.

You can use the graph to find the total cost of having a parcel delivered by Bill.



How much is the fixed charge?

(1 mark)

(b) Ed uses a van to deliver parcels.

For each parcel Ed delivers it costs £1.50 for each mile.

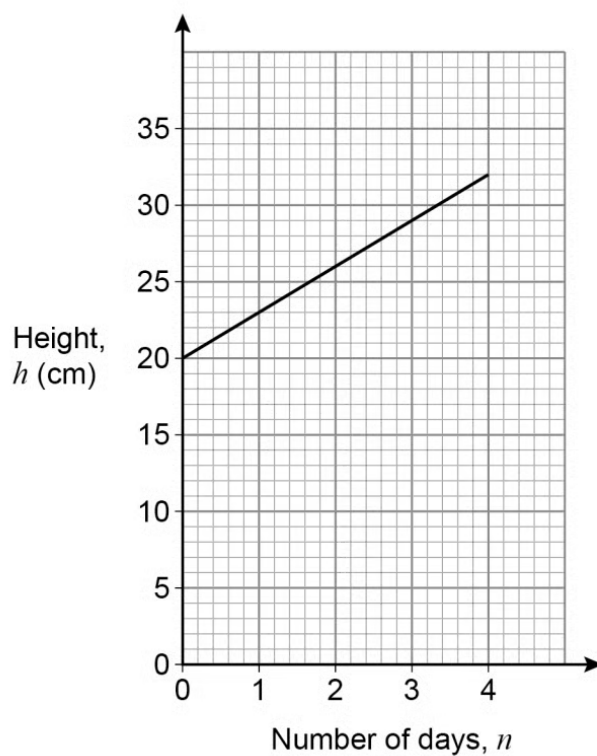
There is **no** fixed charge.

Compare the cost of having a parcel delivered by Bill with the cost of having a parcel delivered by Ed.

(3 marks)

6 Jim buys a plant of height 20 cm.

The graph shows how the height of the plant changes during the next 4 days.



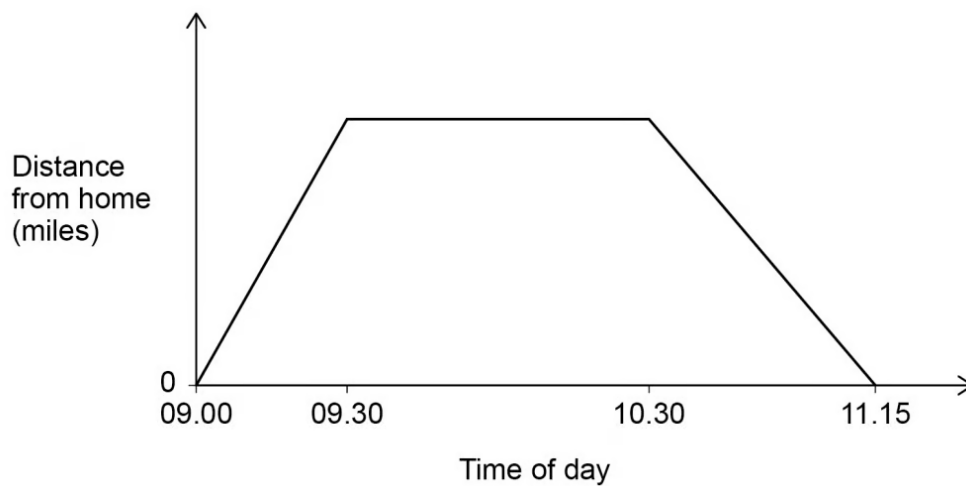
Work out a formula for h in terms of n .

(3 marks)

7 Chris visits a library.

He cycles to the library in half an hour at a speed of 12 miles per hour.
He stays at the library for one hour. He then cycles home.

The sketch graph represents his visit.

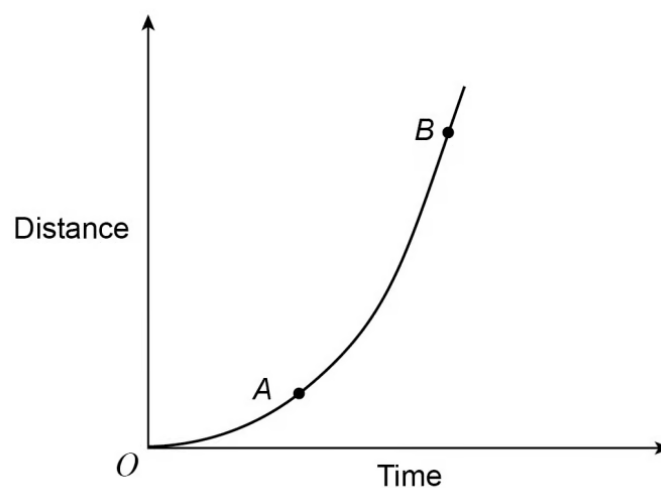


Work out the speed, in miles per hour, at which Chris cycles home.

.....mph

(3 marks)

8 Here is a sketch of a distance-time graph.

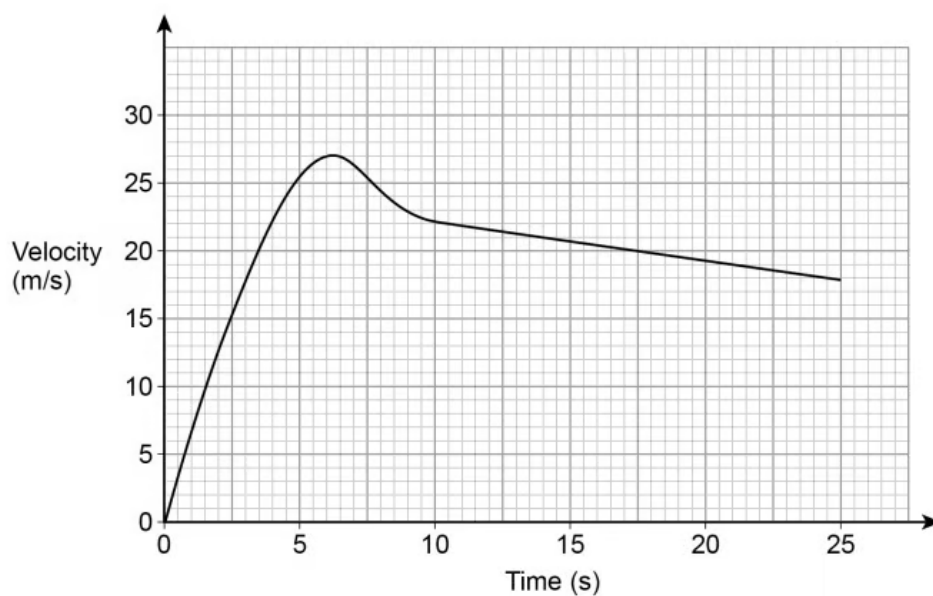


Which of these represents the average speed between *A* and *B*?

- A.** The gradient of the tangent at A
- B.** The gradient of the tangent at B
- C.** The gradient of the chord from A to B
- D.** The gradient of the chord from O to B

(1 mark)

9 (a) Here is a velocity-time graph of a motorbike for 25 seconds.



After how many seconds was the acceleration zero?

.....seconds

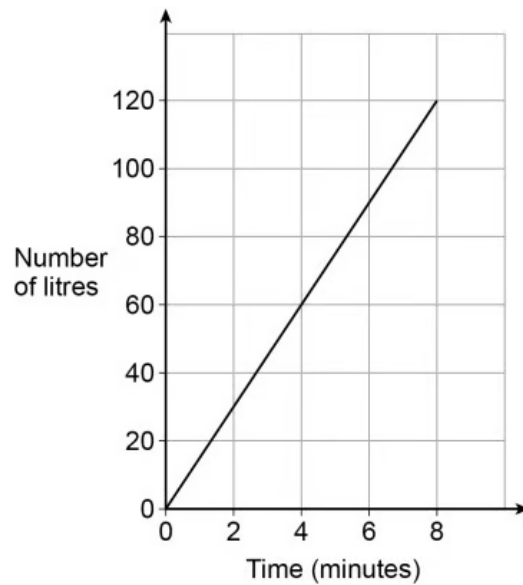
(1 mark)

(b) Work out the distance travelled in the last 15 seconds.

(2 marks)

10 Water is poured into a tank.

The graph shows the number of litres of water in the tank.

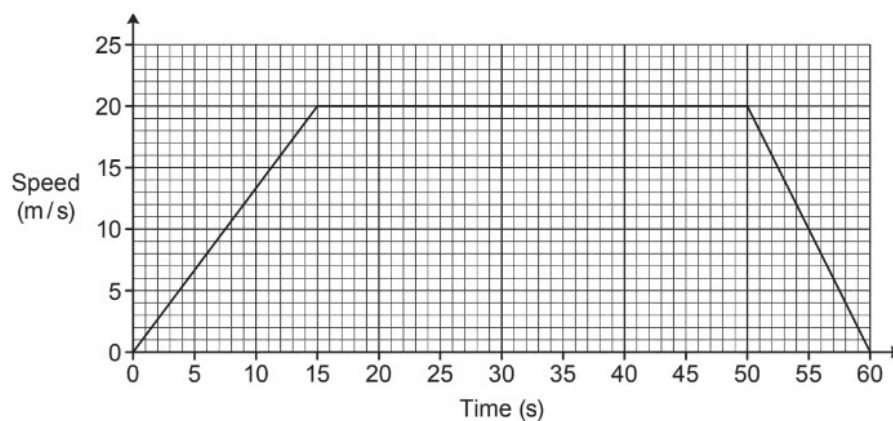


How much water is poured into the tank each minute?

- A.** 1.5 litres
- B.** 15 litres
- C.** 30 litres
- D.** 120 litres

(1 mark)

11 (a) The graph shows the speed of a train during the first 60 seconds of motion.



What is the speed of the train after 9 seconds?

..... m/s

(1 mark)

(b) What does the straight line suggest about the speed of the train over the first 15 seconds?

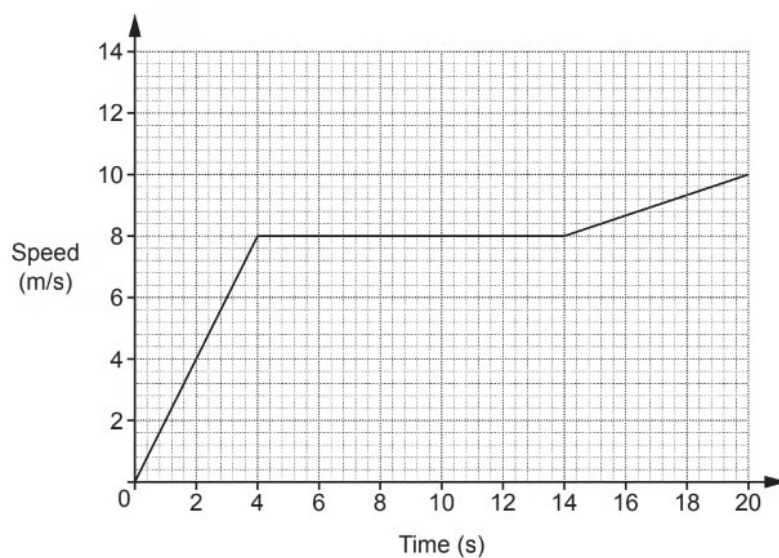
(1 mark)

(c) Work out the average speed of the train, in m/ s, during the 60 seconds.

..... m/ s

(5 marks)

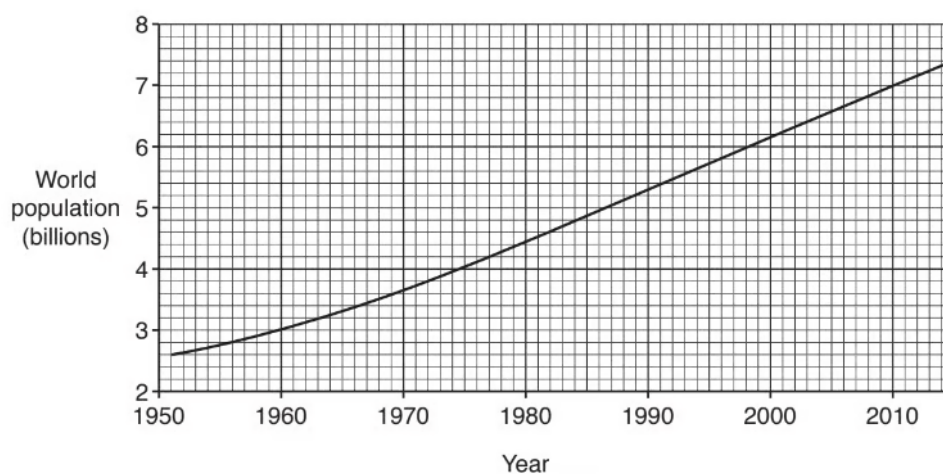
12 The graph shows the speed of a cyclist during 20 seconds of a journey.



Work out the distance travelled by the cyclist during the 20 seconds.

(4 marks)

13 This graph shows the world population, in billions, between 1951 and 2015.

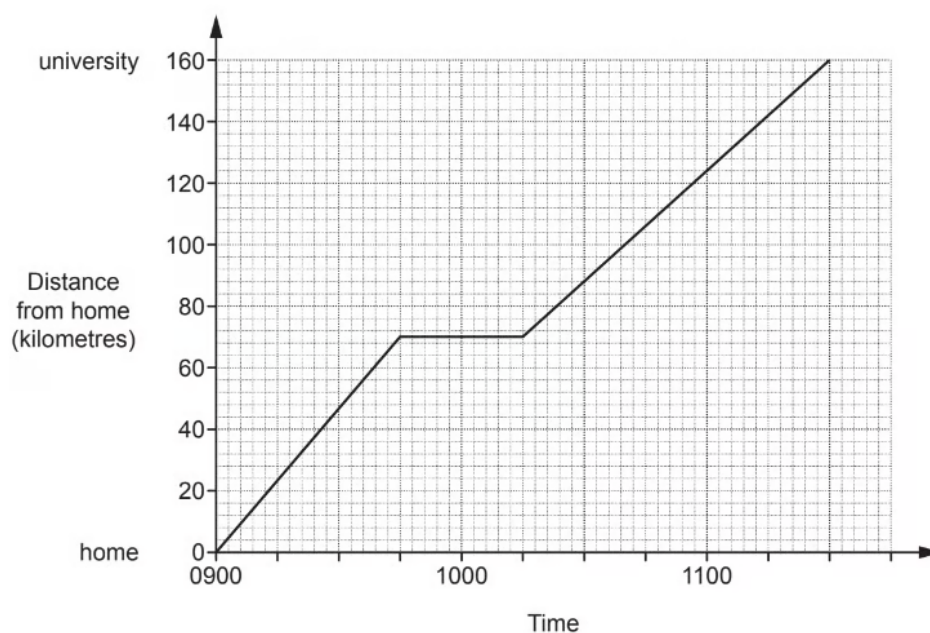


Use the graph to estimate the average rate of growth of the world population between 1951 and 2015.

Give suitable units for your answer.

(3 marks)

14 The graph shows Mia's journey from her home to university.

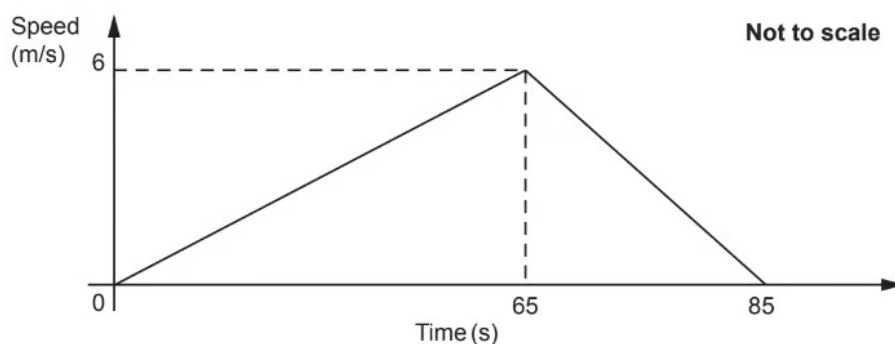


Calculate Mia's average speed for the whole journey.

..... km/h

(3 marks)

15 (a) The graph shows the speed of a tram as it travels from the library to the town hall.



Calculate the deceleration of the tram as it approaches the town hall.

..... m/s^2

(2 marks)

- (b)** Calculate the distance travelled by the tram between the library and the town hall.

..... m

(3 marks)

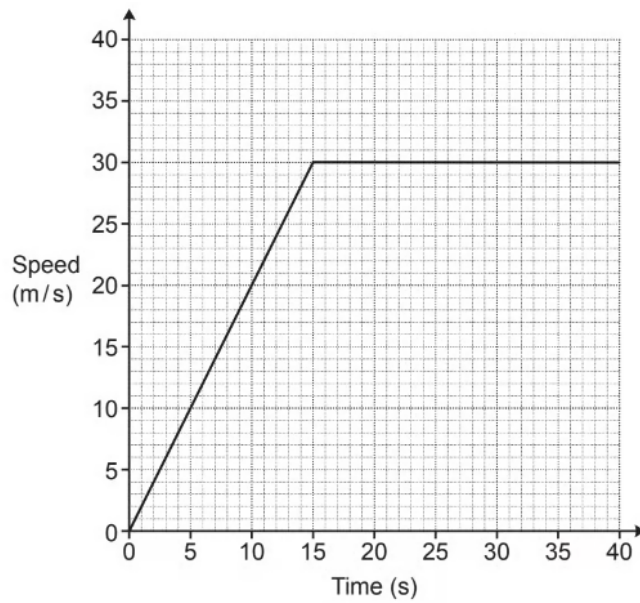
- (c)** What was the maximum speed of the tram as it travelled between the library and the town hall?

Give your answer in **kilometres per hour**.

..... km/h

(4 marks)

16 The graph shows the speed of a vehicle during the first 40 seconds of motion.



Calculate the distance travelled by the vehicle during the 40 seconds.

..... m

(3 marks)

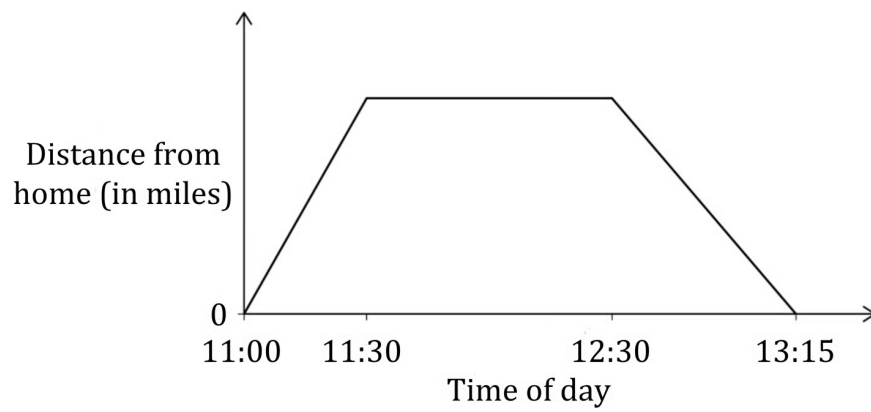
17 Vikram visits a friend.

He cycles to the friend's house in half an hour at a speed of 12 miles per hour.

He stays at the friend's house for one hour.

He then cycles home.

The graph below represents his visit

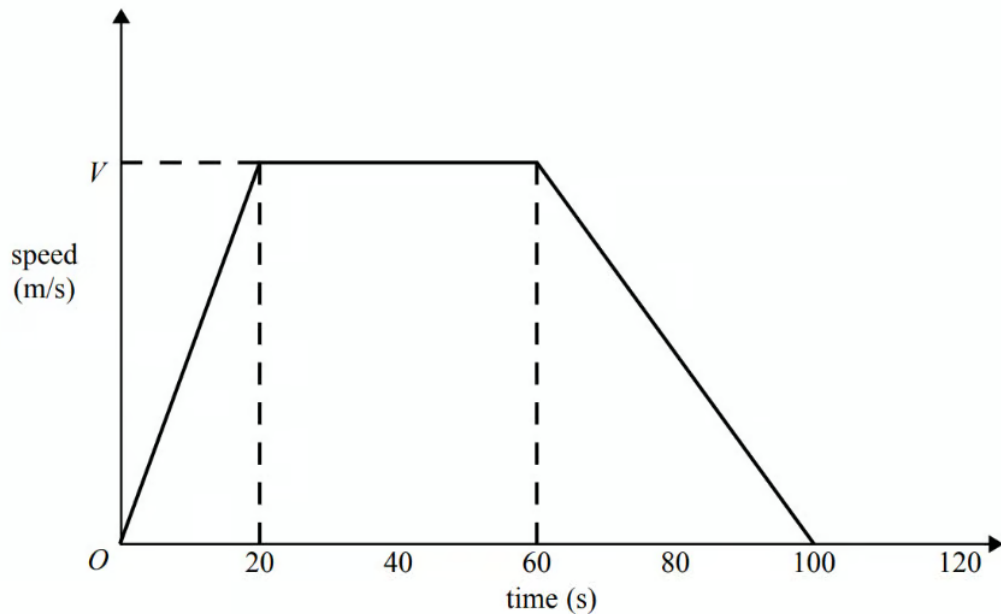


Work out the speed, in miles per hour, at which Vikram cycles home.

(3 marks)

Hard Questions

- 1 (a)** Here is a speed-time graph for a car journey.
The journey took 100 seconds.



The car travelled 1.75km in the 100 seconds.

Work out the value of V .

(3 marks)

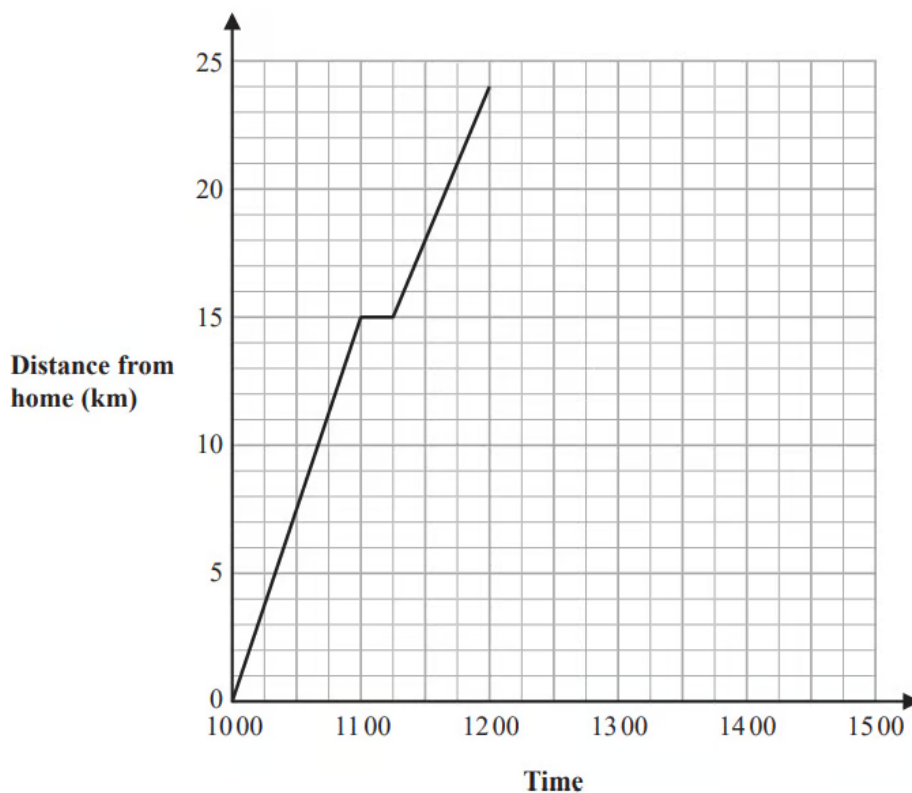
- (b)** Describe the acceleration of the car for each part of this journey.

(2 marks)

2 (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)

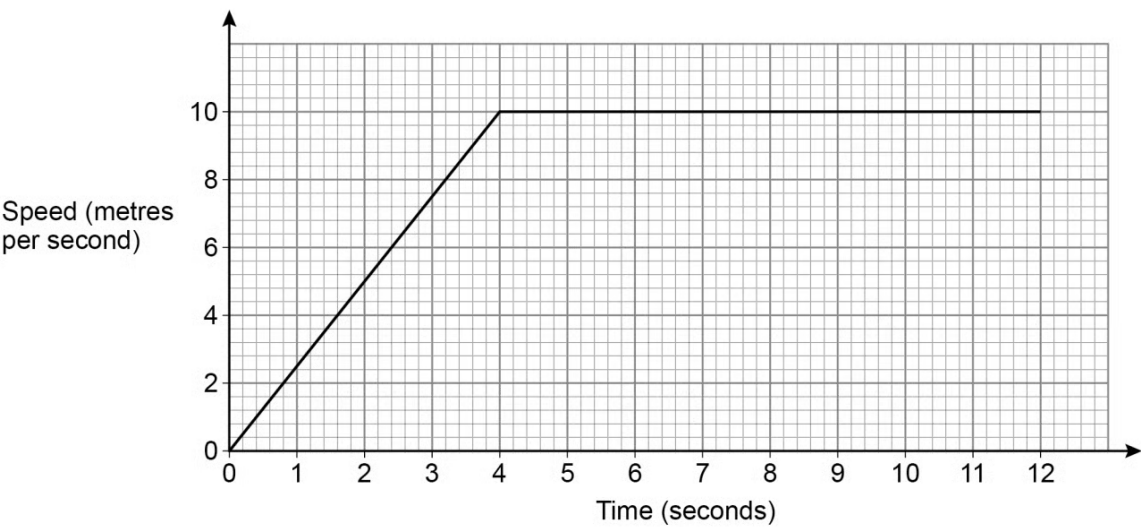
- (c) Work out Jalina’s average cycling speed, in kilometres per hour, for the complete journey to the park and back.
 Do **not** include the times when she was not cycling in your calculation.
 Give your answer correct to 1 decimal place.

.....km/h

(3 marks)

3 A horse runs in a field.

The speed-time graph represents the first 12 seconds of the run.



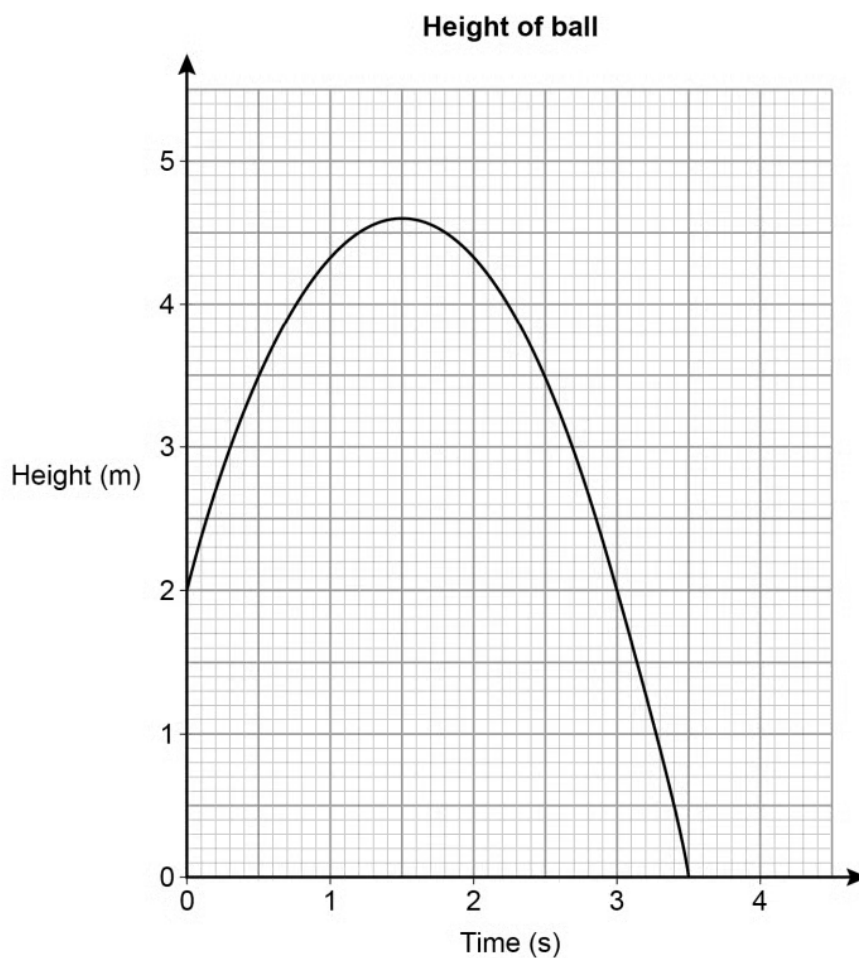
After how many seconds had the horse run a distance of 75 metres?

.....seconds

(3 marks)

4 (a) A ball is thrown vertically upwards.

The graph shows the height of the ball above the ground after it is thrown.



For how many seconds is the ball at a height of **more than** 2 metres?

.....S

(1 mark)

(b) After how many seconds is the ball at instantaneous rest when it is in the air?

.....S

(1 mark)

(c) Work out the average speed of the ball when it is moving downwards.

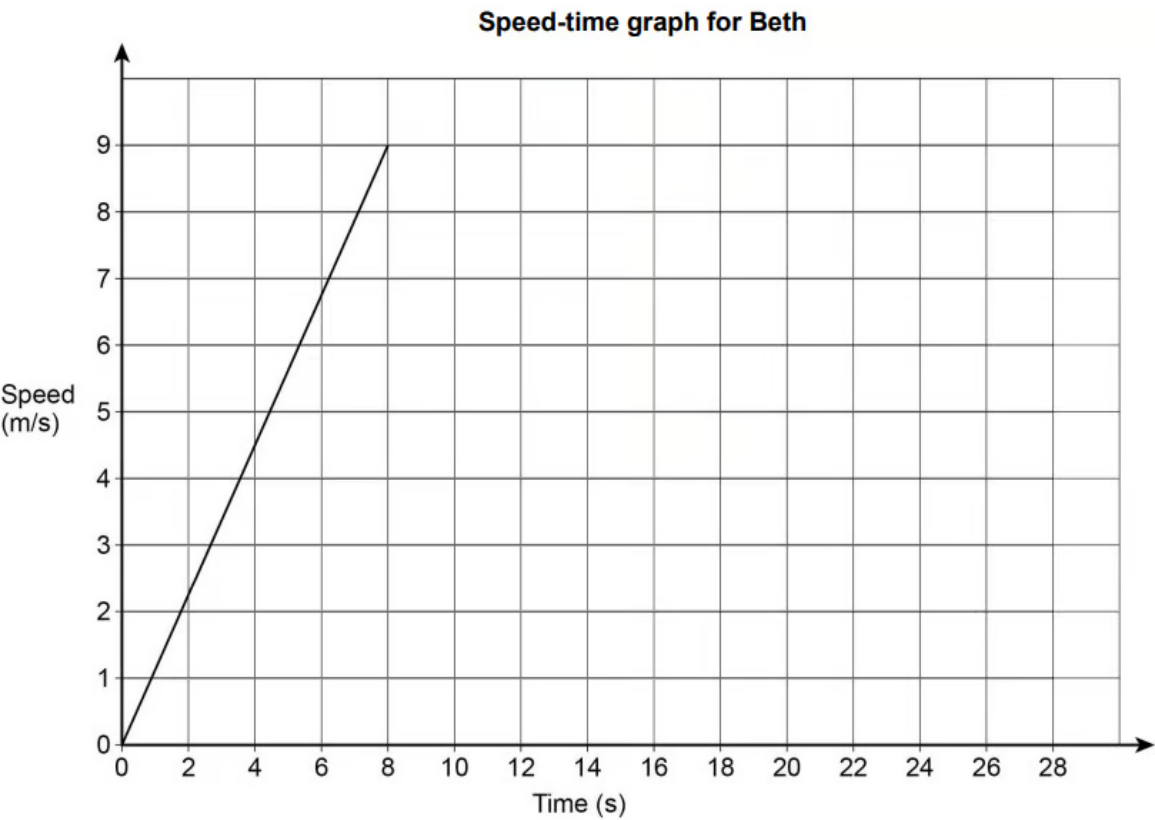
.....m/s

(2 marks)

5 Beth ran a 200 metre race.

Here is a graph of the first 8 seconds of her race.

She completed the race at a constant speed of 9 m/s



Amy completed the race in 27 seconds.

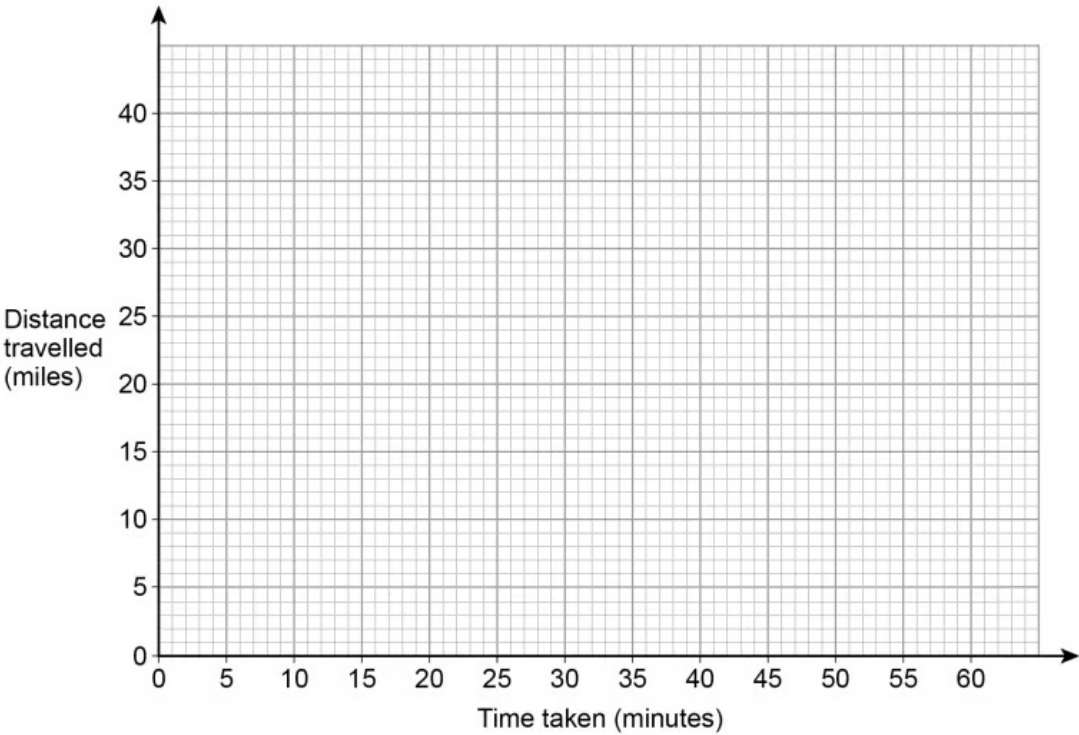
Did Beth finish before Amy? You **must** show your working.

(3 marks)

6 (a) Lily goes on a car journey.

For the first 30 minutes her average speed is 40 miles per hour. She then stops for 15 minutes.
She then completes the journey at an average speed of 60 miles per hour.
The total journey time is 1 hour.

Draw a distance-time graph for her journey.



(3 marks)

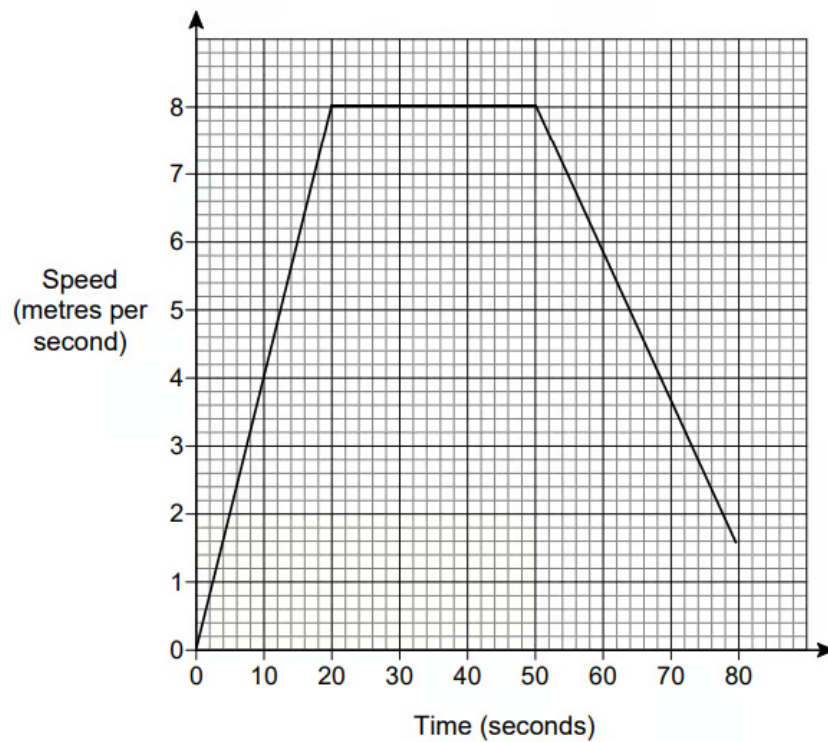
(b) Write down the average speed for the total journey.

..... mph

(1 mark)

7 Amina and Ben had a cycle race.

Here is Amina's speed-time graph from the start of the race.



The distance of the race was 400 metres.

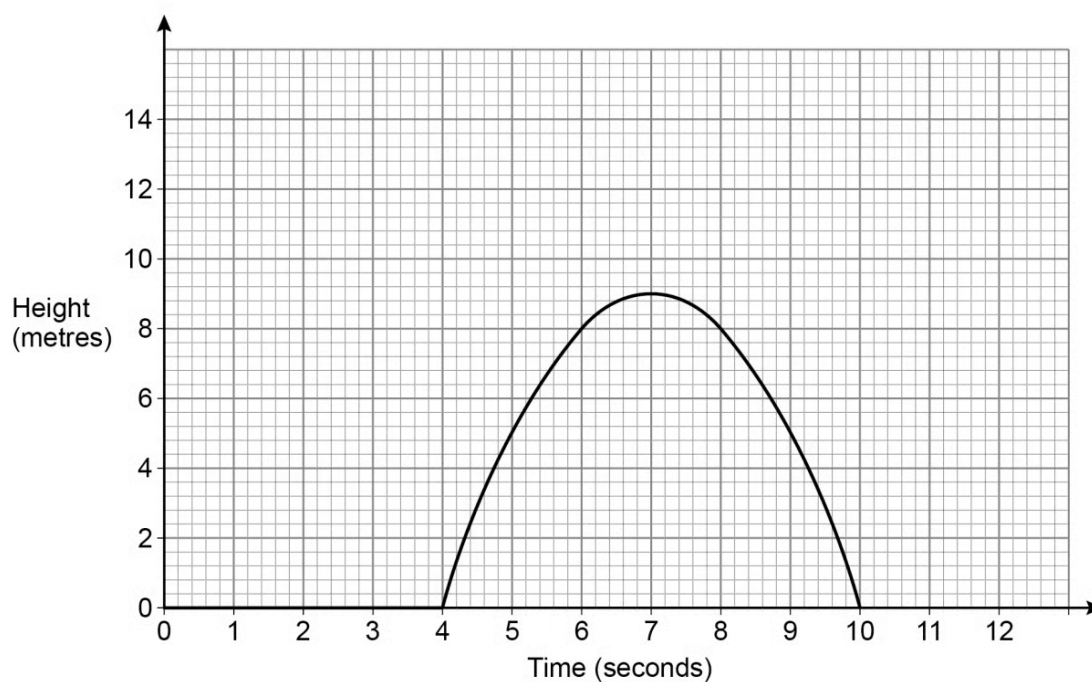
Ben cycled the 400 metres in 64 seconds.

Who won the race?

You **must** show your working.

(4 marks)

8 (a) The graph shows the height above ground of a toy rocket for 10 seconds.



For how long is the rocket in the air?

Circle your answer.

- A.** 10 seconds
- B.** 9 seconds
- C.** 6 seconds
- D.** 4 seconds

(1 mark)

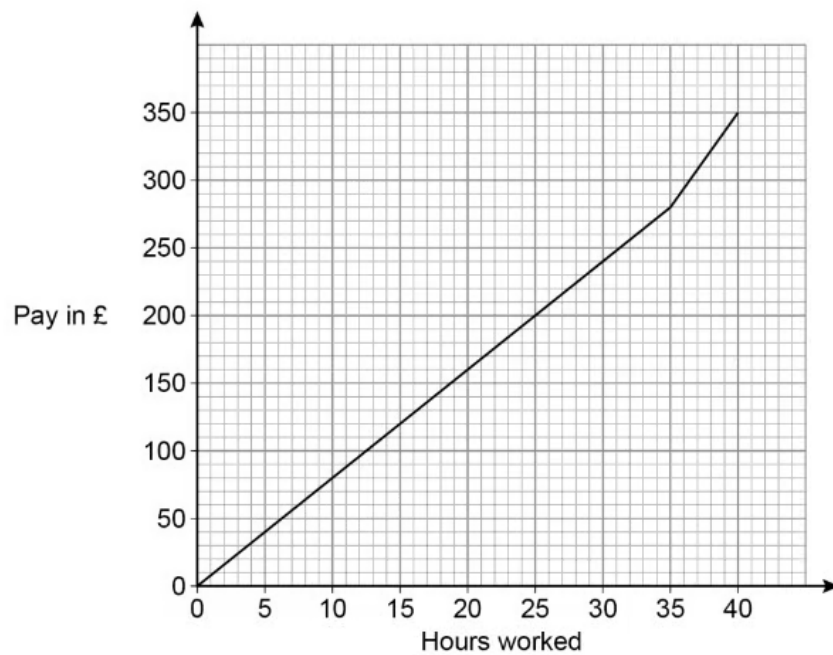
(b) Using the graph, estimate the speed of the rocket after 6 seconds.

State the units of your answer.

(3 marks)

9 The graph shows how much Molly is paid for working for up to 40 hours. She receives

- a basic rate of pay for the first 35 hours worked
- a higher rate of pay for the next 5 hours worked.



Work out the difference between the higher rate of pay and the basic rate of pay.
Give your answer in £ per hour.

£.....per hour

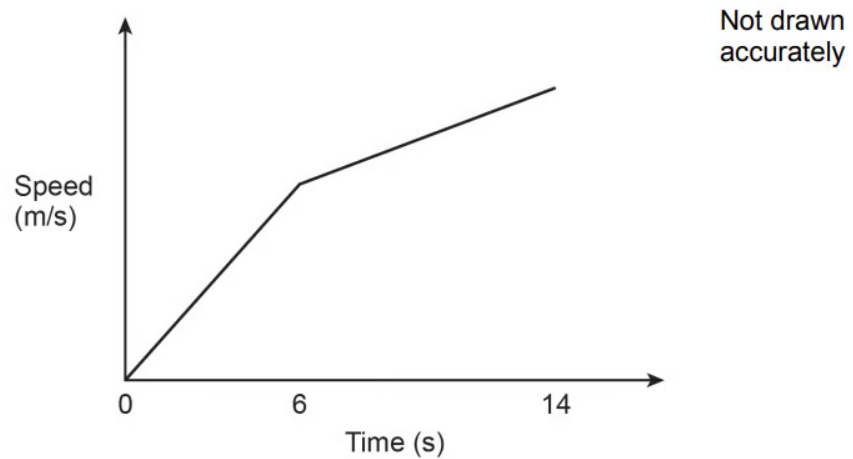
(3 marks)

10 (a) Izzy runs an 80-metre race in 14 seconds.

During the first 6 seconds her speed increases at a constant rate. During the last 8 seconds her speed increases at a different constant rate.

Her speed at 14 seconds is 2 m/s more than her speed at 6 seconds.

Here is a sketch of her speed-time graph.



Work out her acceleration during the last 8 seconds.

State the units of your answer.

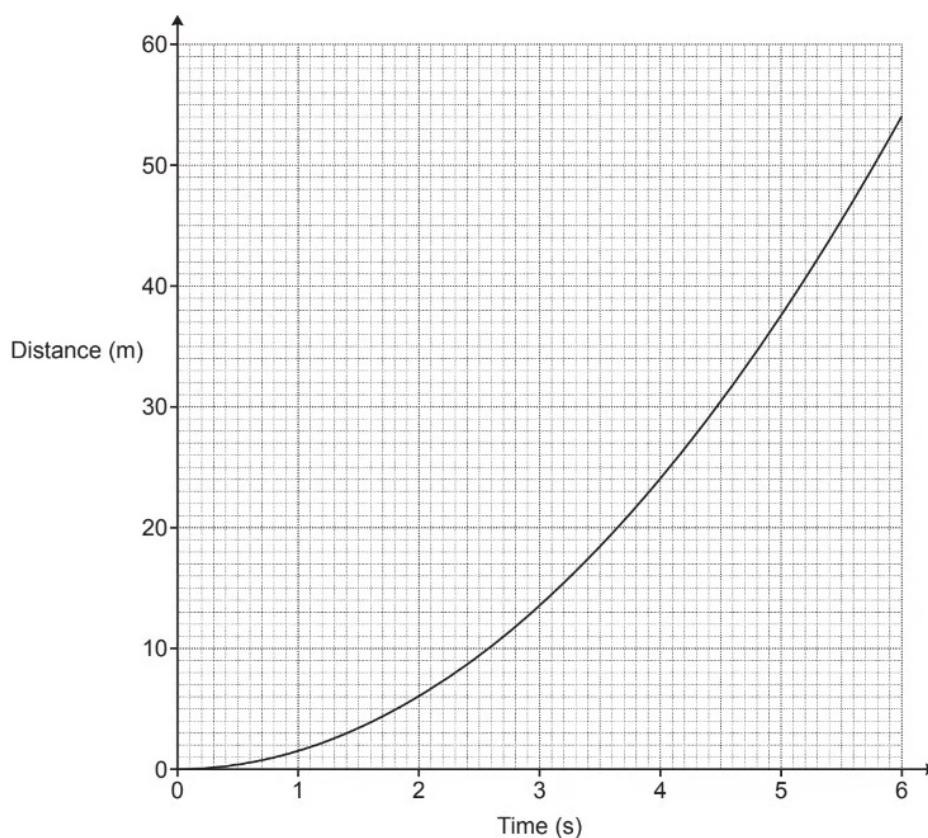
(2 marks)

(b) When Izzy finishes the 80-metre race, her speed is v m/s

Work out the value of v .

(4 marks)

11 (a) The graph shows the distance travelled by a particle over 6 seconds.



Work out the average speed of the particle between 2 and 4 seconds.

..... m/s

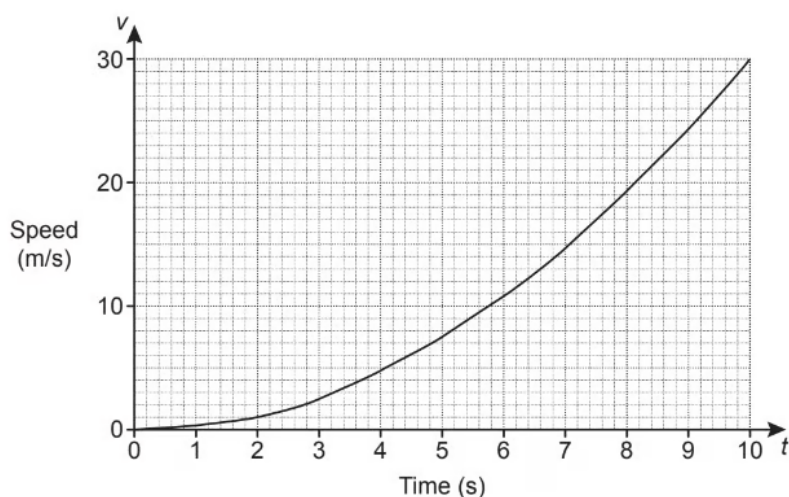
(2 marks)

(b) Estimate the speed of the particle at 4 seconds.

..... m/s

(4 marks)

12 (a) The graph shows the speed, v metres per second (m/s), of a car at time t seconds.



Find the speed of the car at $t = 7$.

..... m/s

(1 mark)

(b) It is claimed that the car has accelerated from 0 to 60 miles per hour in the first 10 seconds.

Does the graph support this claim?

Show your reasoning. Use 1 mile = 1.6 kilometres.

(5 marks)

(c) Use the graph to estimate the acceleration at $t = 7$.

.....m/s²

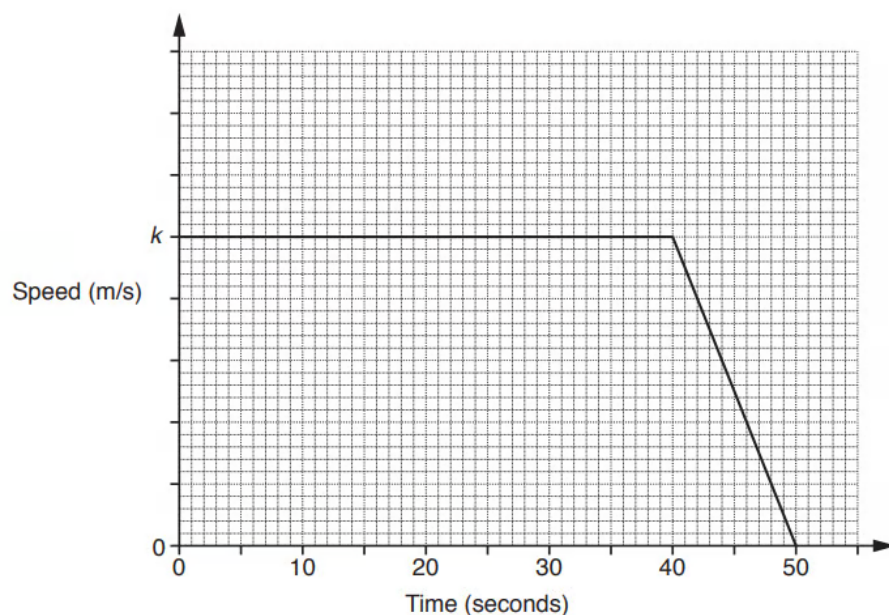
(3 marks)

- (d)** Georgina says that the graph shows that the speed of the car will continue to increase after 10 seconds.

Make one comment to show that this statement is incorrect.

(1 mark)

- 13 (a)** The graph shows information about the speed of a vehicle during the final 50 seconds of a journey.
At the start of the 50 seconds the speed is k metres per second. The distance travelled during the 50 seconds is 1.35 kilometres.



Work out the average speed of the vehicle during the 50 seconds.
Give your answer in metres per second.

..... m/s

(2 marks)

- (b)** Work out the value of k .

$k =$

(5 marks)

(c) i) Calculate the gradient of the graph in the final 10 seconds of the journey.

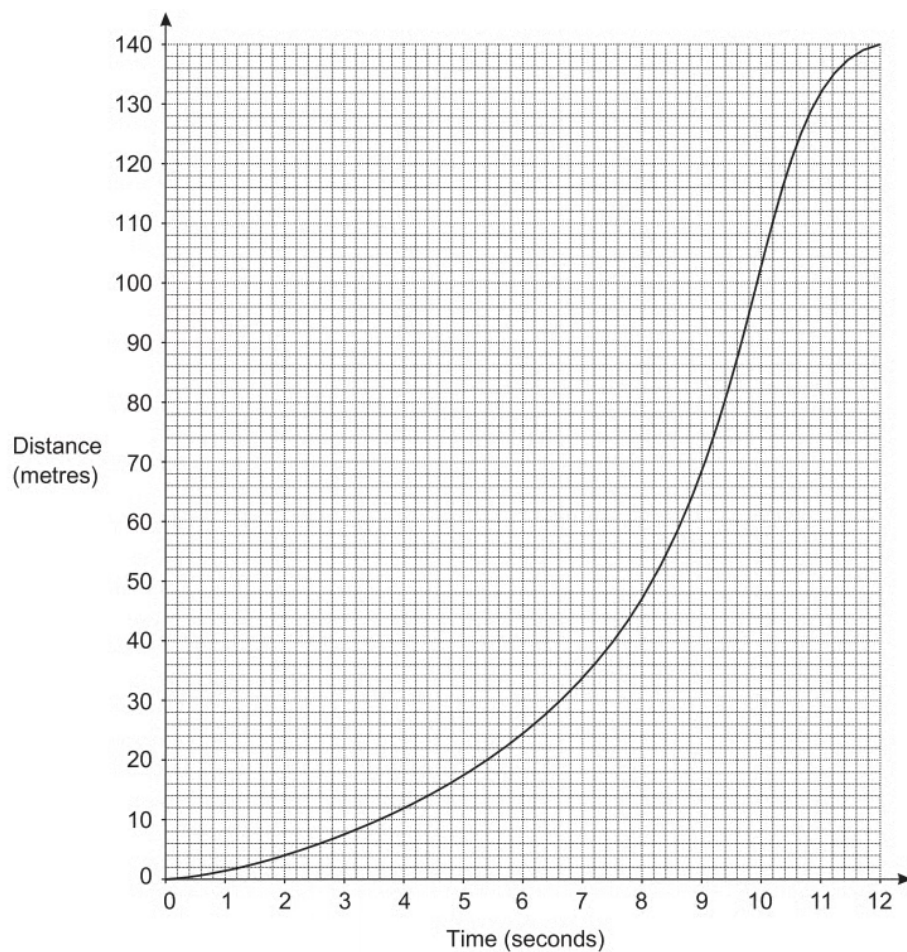
[1]

ii) Describe what this gradient represents.

[2]

(3 marks)

14 (a) The graph shows the distance travelled by an animal over 12 seconds.



Work out the average speed between 2 and 8 seconds.

..... m/s

(2 marks)

(b) Estimate the speed of the animal at 6 seconds.

..... m/s

(4 marks)

(c) Nuri says

I think this animal must be able to move at over 20m/s!

Do you agree with Nuri?

Explain your decision.

(2 marks)

15 (a) A toy car is placed on the floor of a sports hall.

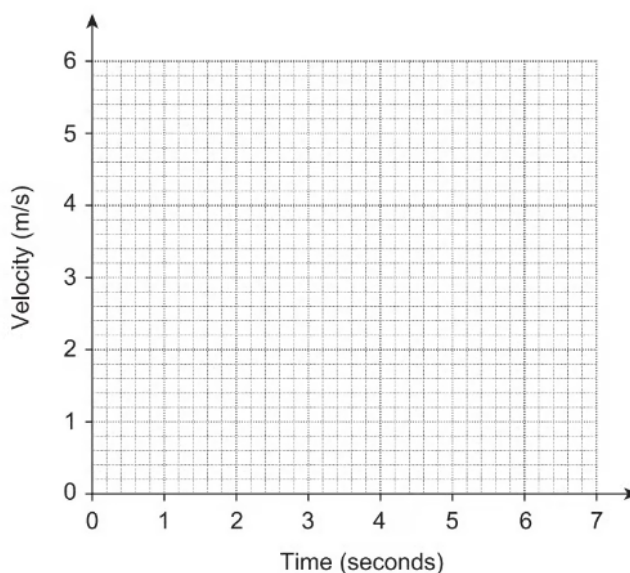
It moves in a straight line starting from rest.

It travels with constant acceleration for 4 seconds reaching a velocity of 5 m/s.

It then slows down with constant deceleration of 1 m/s^2 for 2 seconds.

It then hits a wall and stops.

Draw a velocity-time graph for the toy car.



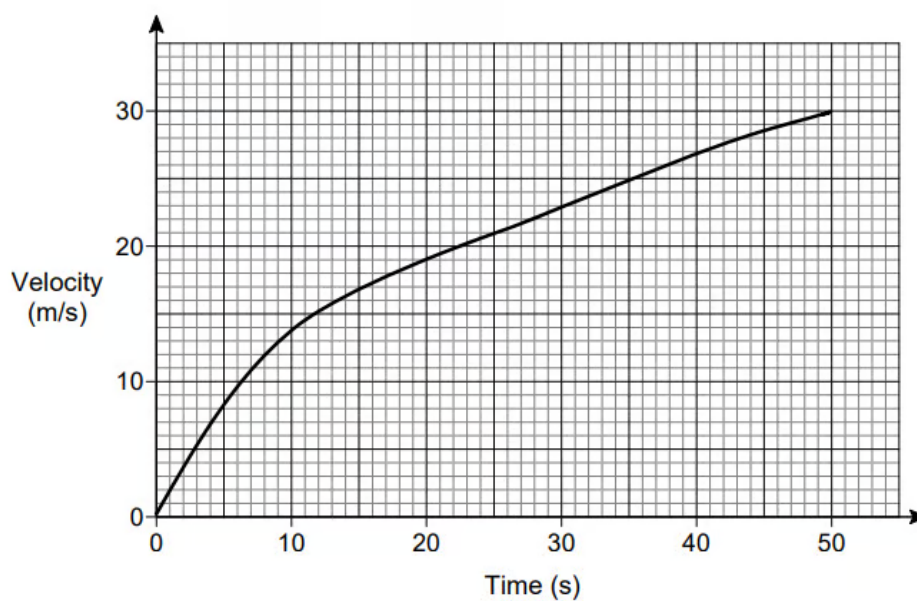
(3 marks)

(b) Work out the total distance travelled by the toy car.

..... m

(3 marks)

16 (a) Here is the velocity-time graph of a car for 50 seconds.



Work out the average acceleration during the 50 seconds.
Give the units of your answer.

(2 marks)

- (b)** Estimate the time during the 50 seconds when
the instantaneous acceleration = the average acceleration

You **must** show your working on the graph.

..... seconds
(2 marks)