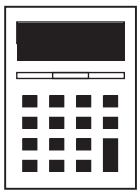
GCSE MATHEMATICS

Speed/Time Graphs



AQA These questions have been taken or modified from previous AQA GCSE Mathematics Papers.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The quality of your written communication is specifically assessed in questions that are indicated with an asterisk (*).

Advice

- Read each question carefully before you start to answer it.
- In all calculations, show clearly how you work out your answer.
- Use the number of marks for the question as a guide to the amount of time you need to spend.
- Look at previous parts of the question, e.g. a), b), c) i) as there may be information there you need to answer later parts.
- Check your answer is realistic and appropriate.
- For calculator decimal numbers always write your full calculator display in the working out area and then, if you need to, round the answer on the answer line.

This booklet was curated and modified using AQA examination papers between 2010-2016, for thecalculatorguide.com , where you can find many more booklets on further topics. All questions used are reproduced for educational purposes only.

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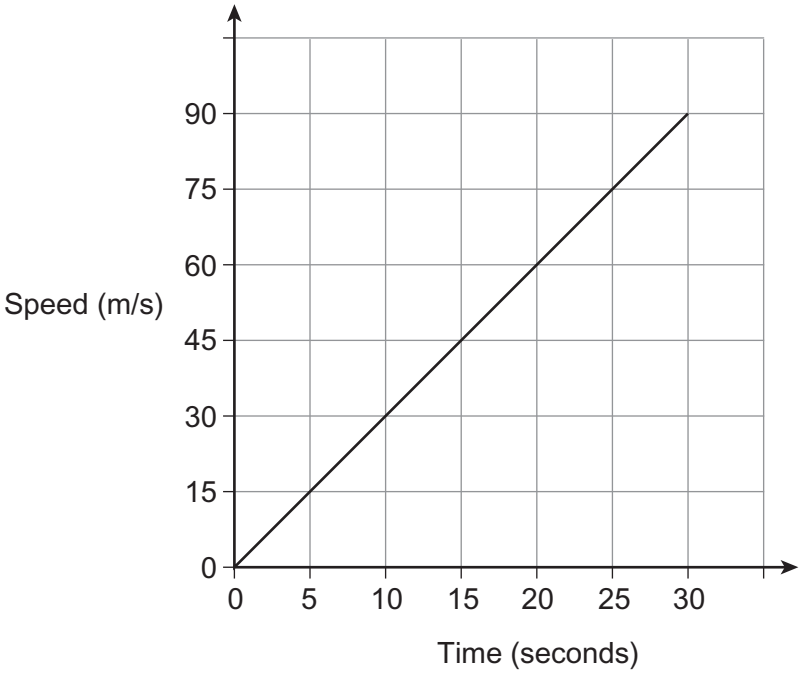
1 A plane accelerates along a runway for 30 seconds.
The graph shows the speed-time graph for the plane.



1 (a) The plane takes off after 30 seconds.

What is the speed of the plane when it takes off?

Answer ..... m/s *(1 mark)*

1 (b) Work out the distance the plane travels on the runway.

Give your answer in kilometres.

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Answer ..... km *(3 marks)*

1 (c) Work out the acceleration of the plane.

State the units of your answer.

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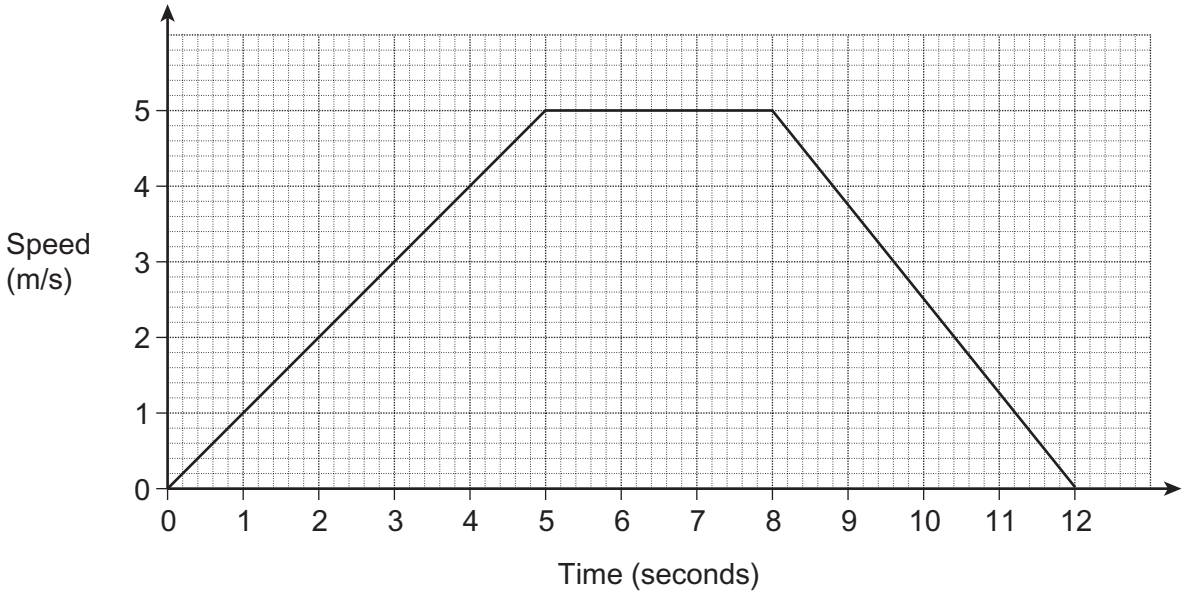
Answer ..... *(3 marks)*

2 Meera runs for 12 seconds.
Her speed, in metres per second, is shown on the graph.



2 (a) For how many seconds does she run at a constant speed?

Answer ..... seconds *(1 mark)*

2 (b) Work out the total distance she runs.

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Answer ..... metres *(3 marks)*

2 (c) Work out the gradient of the graph during the first 5 seconds.

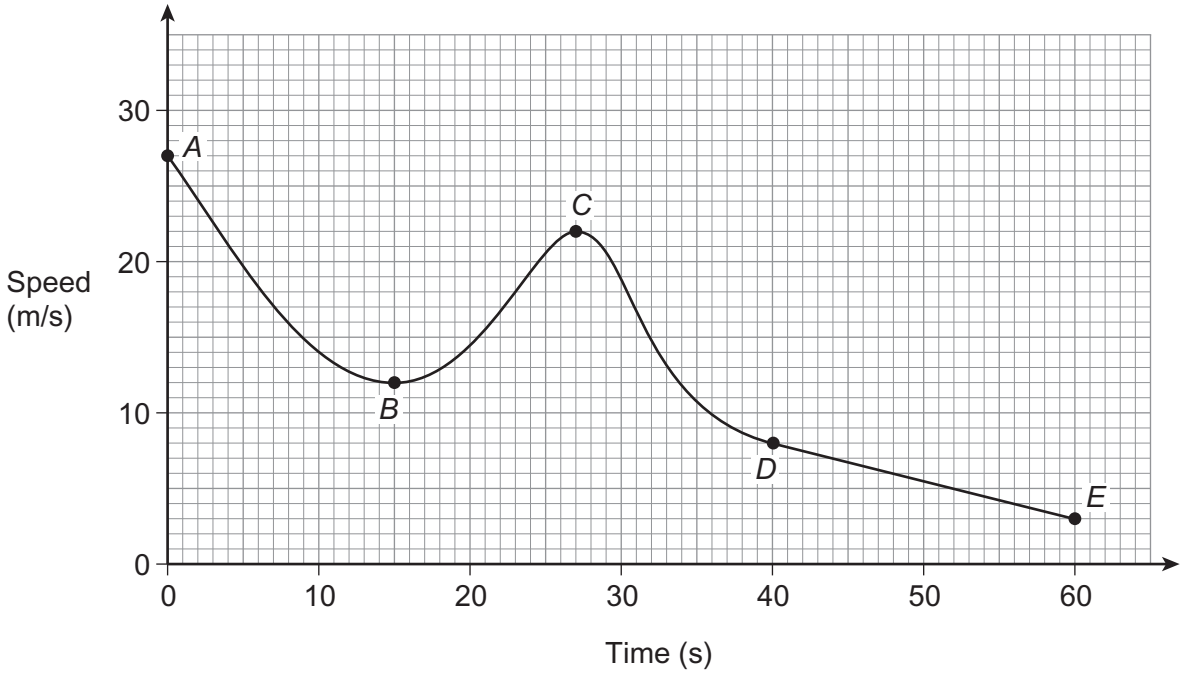
Answer ..... m/s^2 *(1 mark)*

2 (d) What does the gradient in part (c) represent?
Circle your answer.

time speed distance acceleration

(1 mark)

3 (a) The diagram shows the speed-time graph of a car for 60 seconds.



Which **two** points on the graph show when the car has an acceleration of zero?

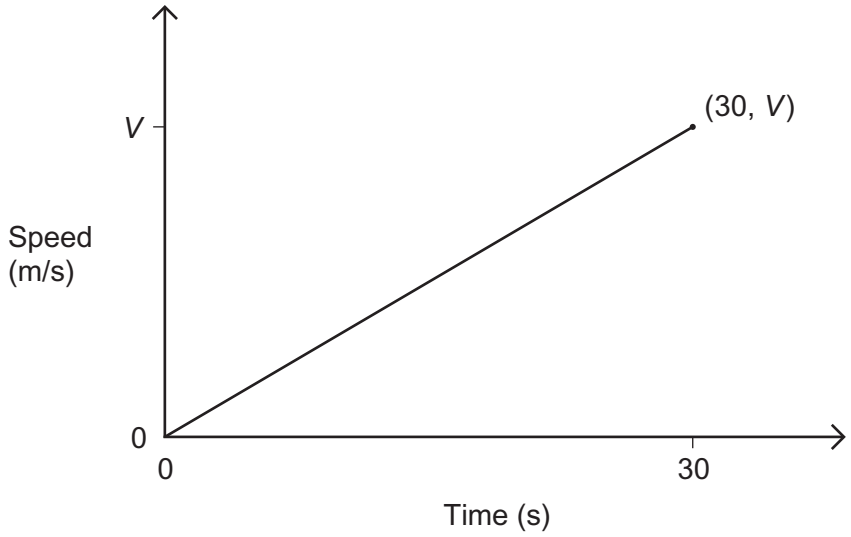
Circle your answers below.

[1 mark]

A *B* *C* *D* *E*

3 (b) This diagram shows the speed-time graph of a lorry for 30 seconds.

After 30 seconds the speed of the lorry is V m/s



The lorry travels a distance of 270 metres in these 30 seconds.

Work out V.

[2 marks]

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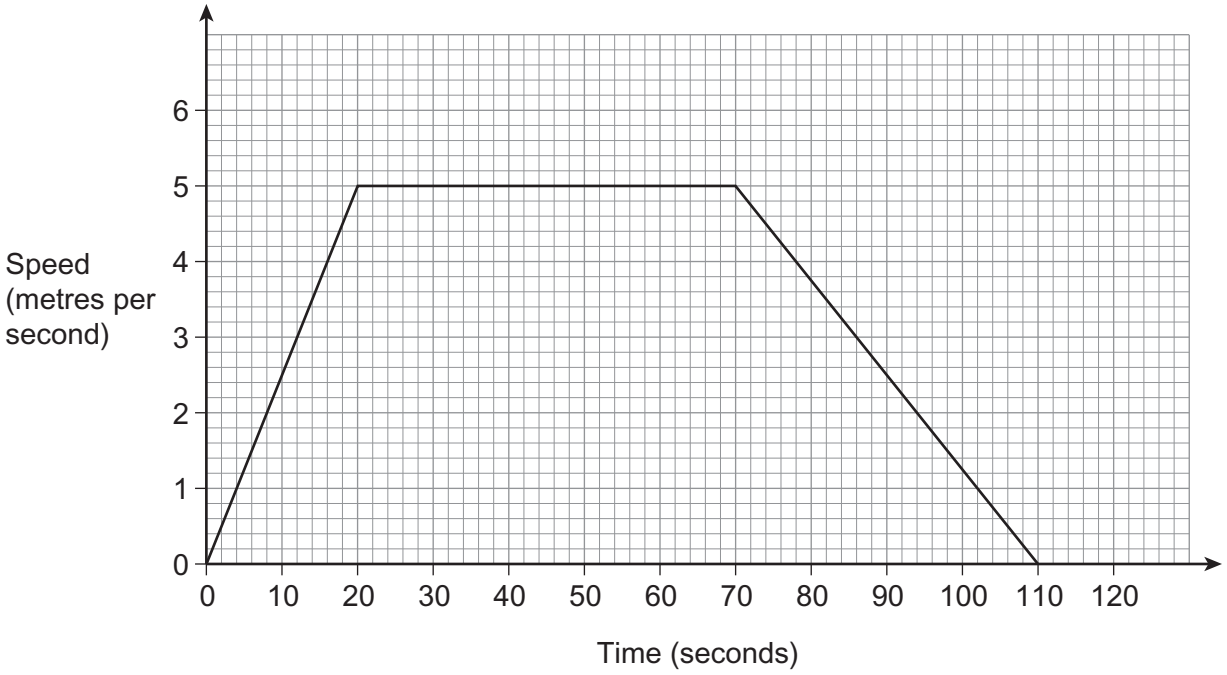
Answer ..... m/s

4 The distance around a cycle track is 400 metres.

Robin cycles on the track.
Here is his speed-time graph.



4 (a) Show that Robin cycles **exactly** once around the track in 110 seconds.

[2 marks]

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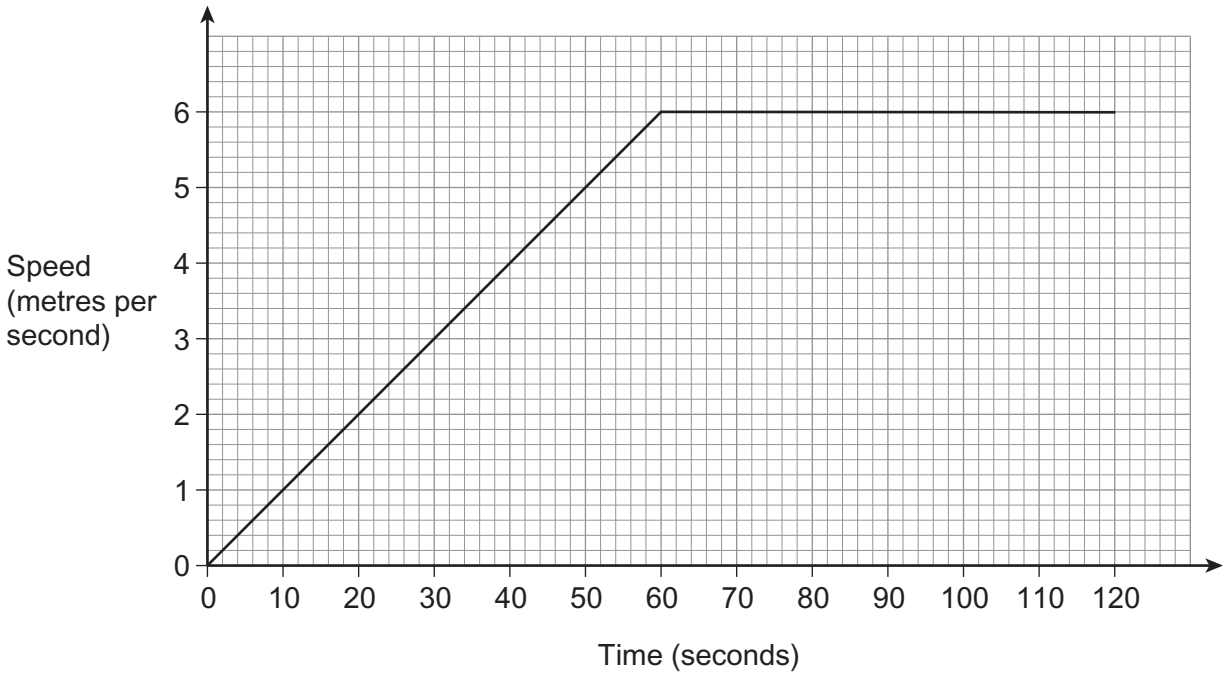
4 **(b)** Sanjay cycles on the same track.

Here is his speed-time graph.



Does Sanjay cycle the first 400 metres in a quicker time than Robin?
You **must** show your working.

[3 marks]

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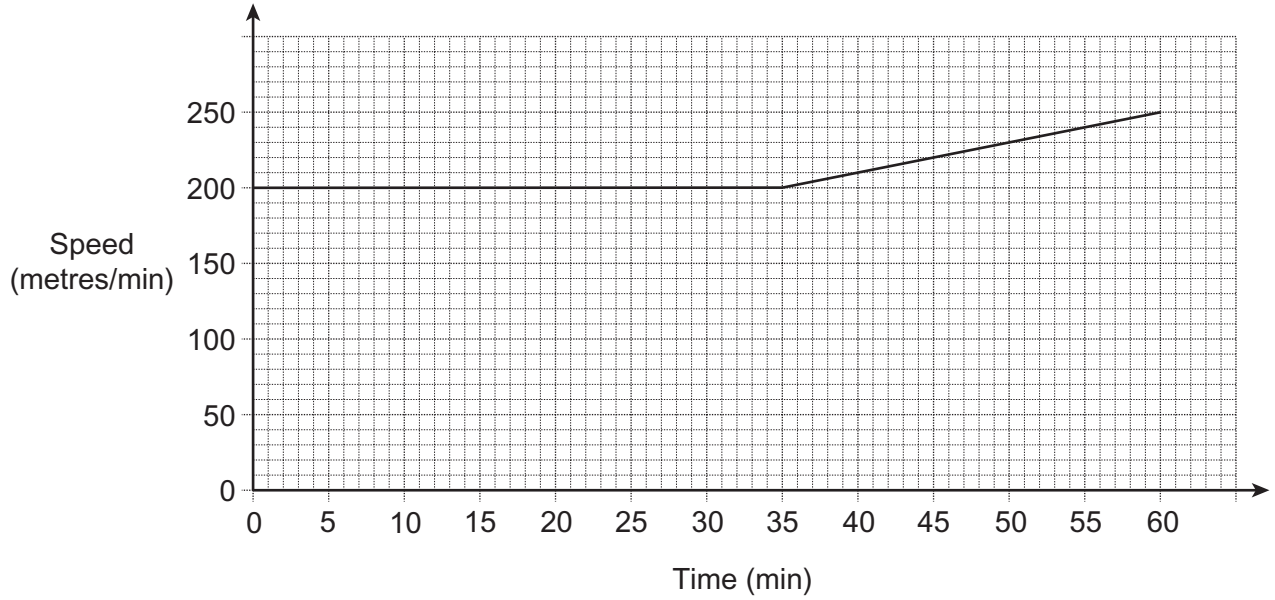
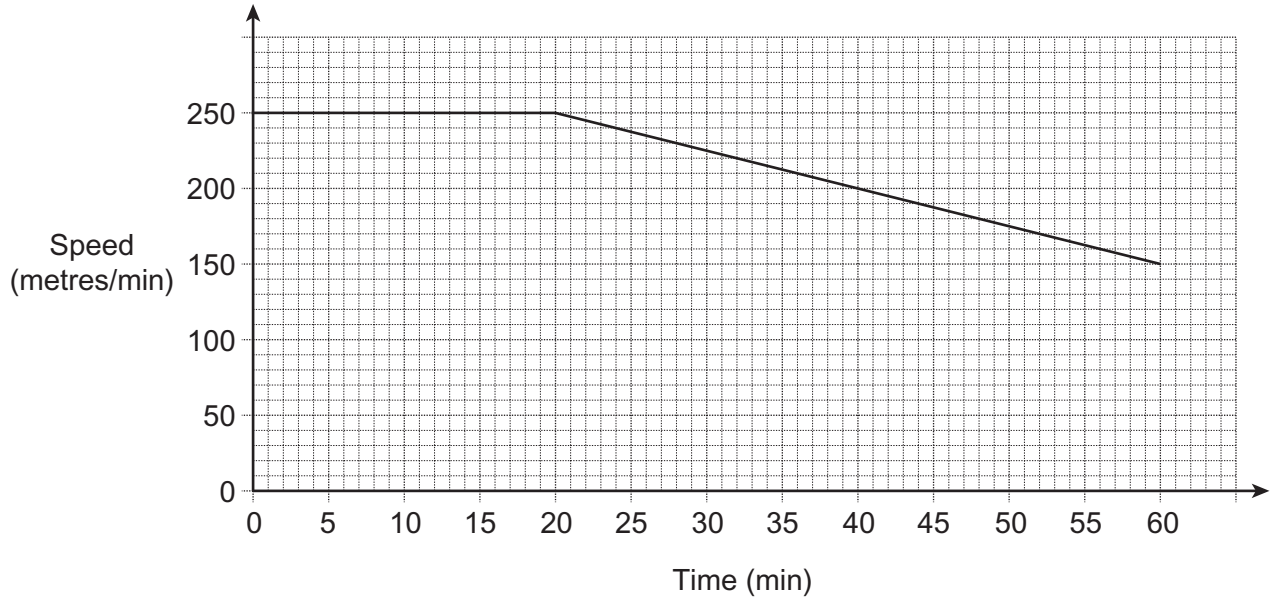
5 Chloe is training for a marathon.
These speed-time graphs model her training runs on Monday and Wednesday.

Monday



Wednesday



On which day did Chloe run further?
You **must** show your working.

[4 marks]

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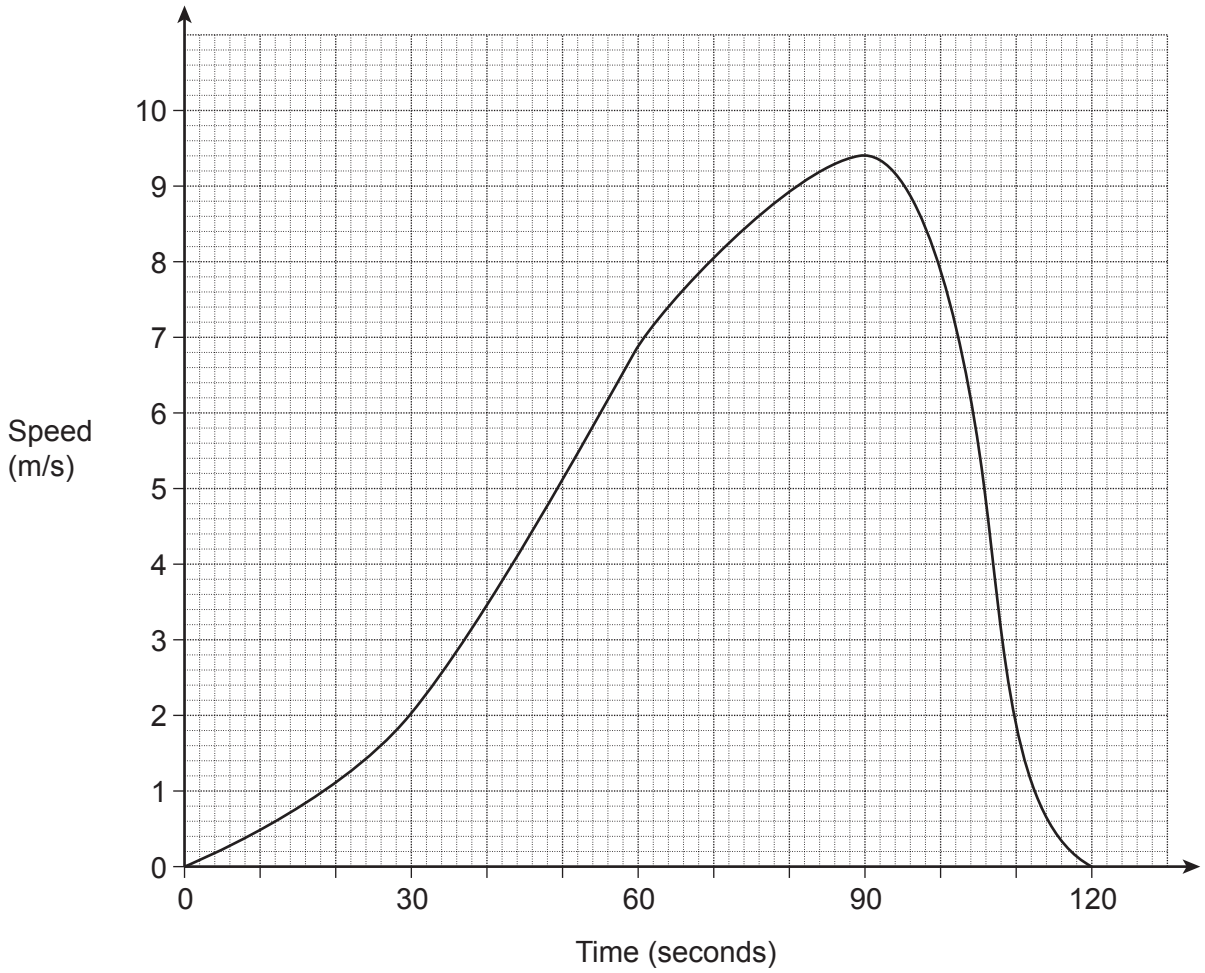
Answer .....

6 The graph shows the speed of a snowboarder for 2 minutes.



6 (a) Estimate the distance travelled by the snowboarder.
State the units of your answer.

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Answer ..... *(4 marks)*

6 (b) Work out the gradient of the graph at 70 seconds.

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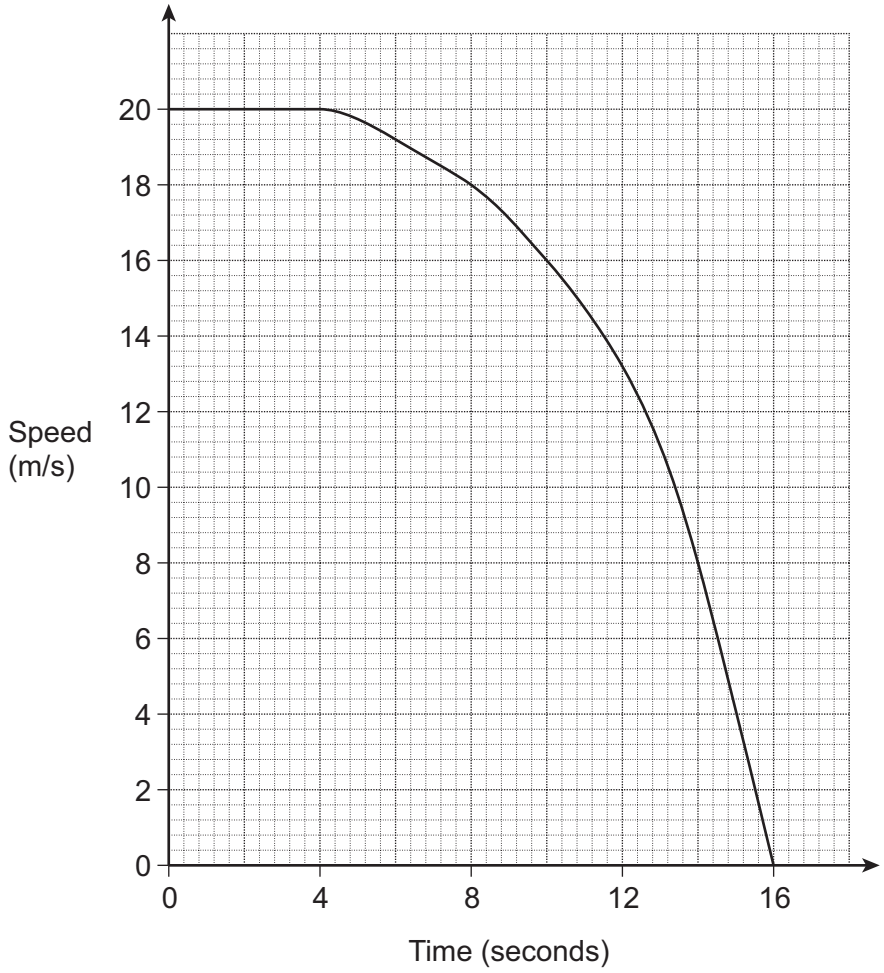
Answer ..... m/s^2 *(3 marks)*

***7** The graph shows the speed of a train for 16 seconds.



7 (a) For how many seconds is the train travelling at a speed of less than 8 m/s?

Answer ..... seconds *(1 mark)*

7 (b) Work out an estimate of the average speed of the train during the 16 seconds.

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Answer ..... m/s *(6 marks)*

7 (c) (i) Work out an estimate for the gradient of the graph after 8 seconds.

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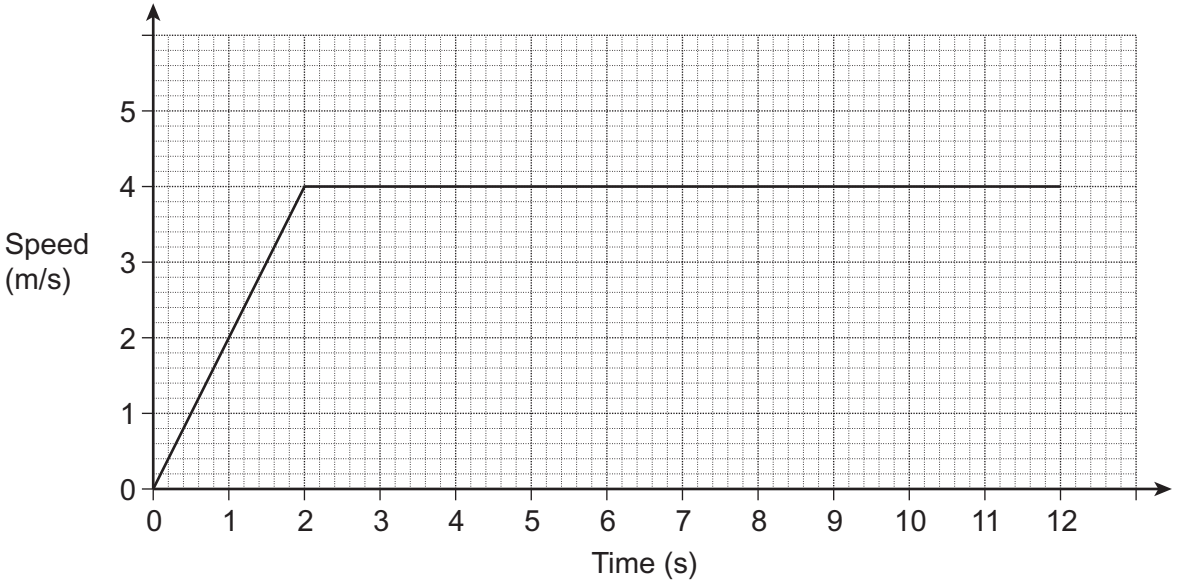
Answer ..... *(3 marks)*

7 (c) (ii) What does this gradient represent?

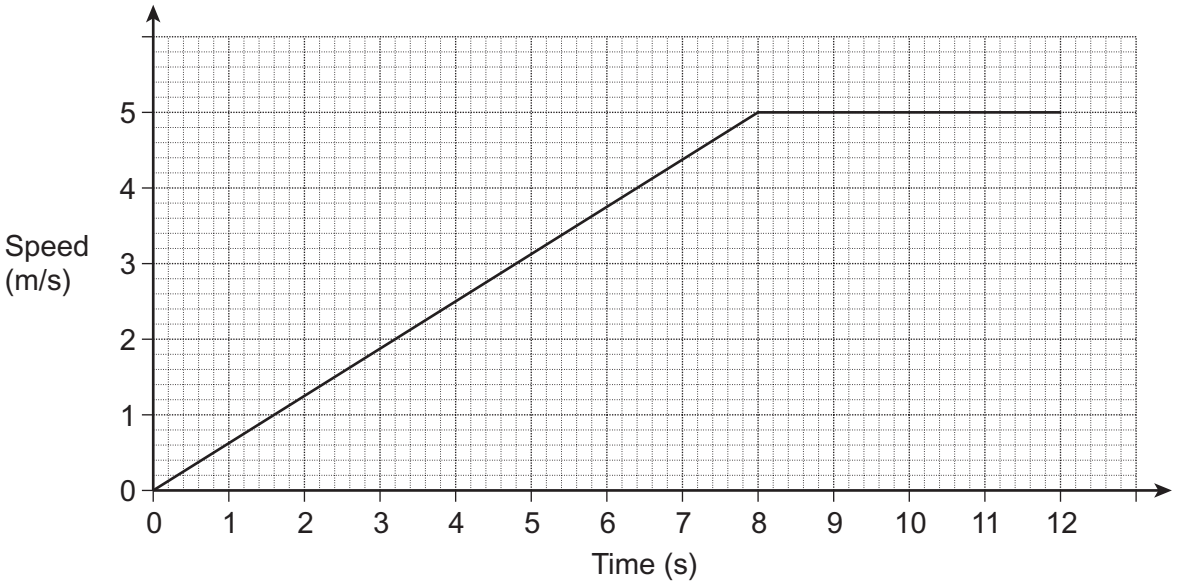
Answer ..... *(1 mark)*

8 Amy and Sue run a race.
The race is won in exactly 12 seconds.

The graph shows Amy's speed in metres per second.



This graph shows Sue's speed in metres per second.



Who won the race?
You **must** show your working and give reasons for your answer.

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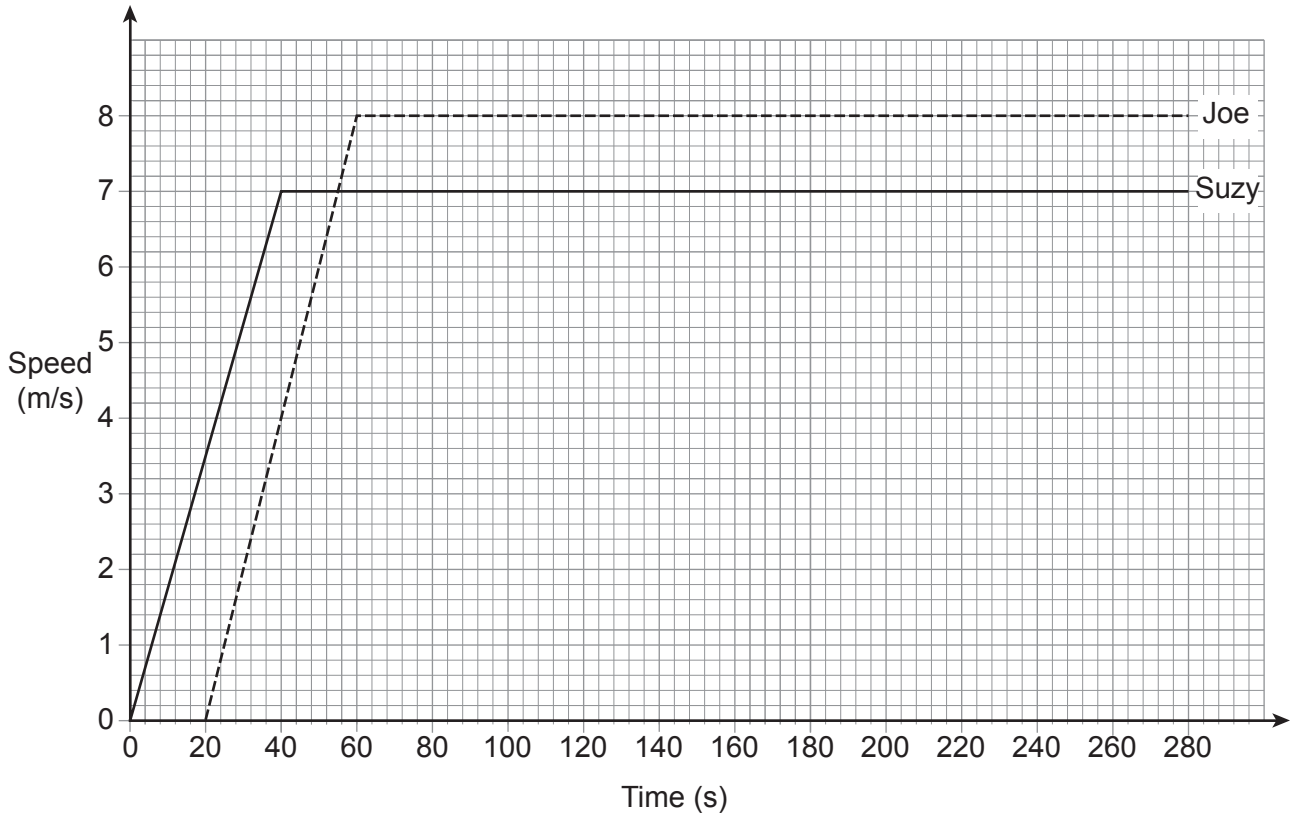
Answer ..... *(5 marks)*

9 Suzy and Joe cycle round a track.
One lap of the track measures 400 metres.

They both start from the same place.
Joe starts 20 seconds after Suzy starts.

Here are the speed-time graphs for their journeys.



***9 (a)** Show that Joe overtakes Suzy when they are on their third lap of the track.

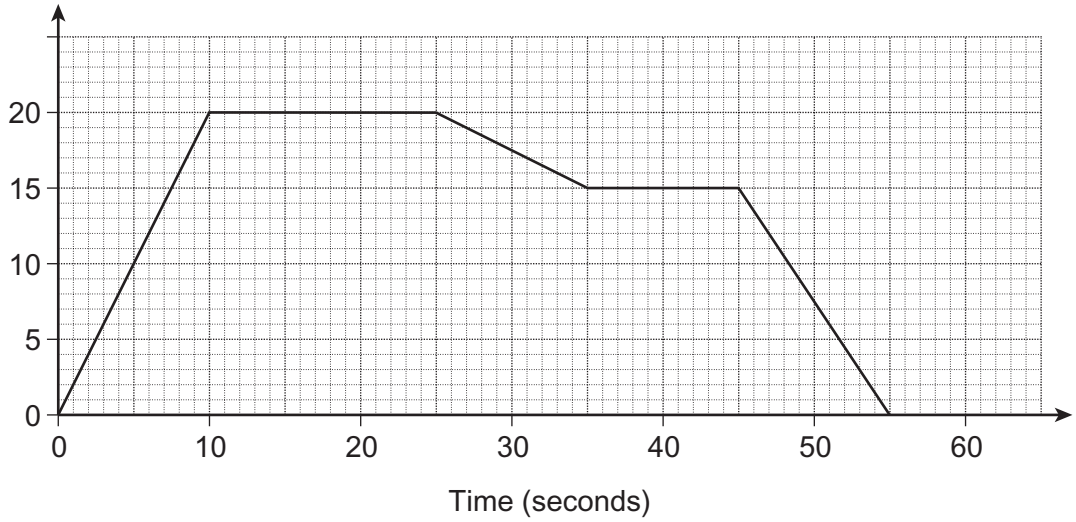
[4 marks]

9 (b) Work out Suzy's acceleration during the first 40 seconds.
State the units of your answer.

[2 marks]

Answer _____

10 This speed-time graph shows the journey of a bus as it travels between two bus stops.



After how many seconds does the bus pass the halfway point between the bus stops?

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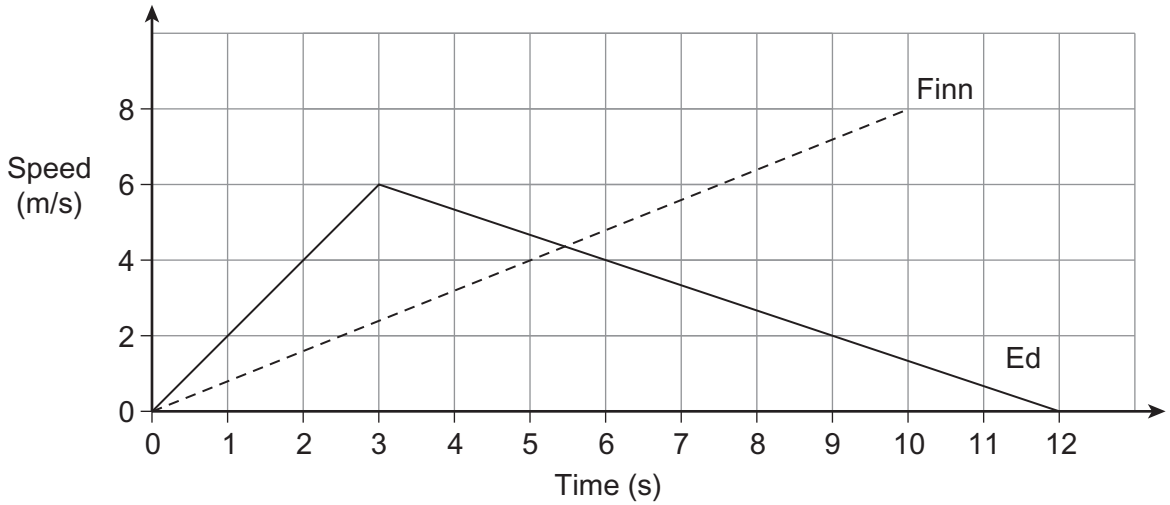
Answer ..... seconds *(5 marks)*

11 Ed and Finn both run along the same track.

Ed runs for 12 seconds.

Finn runs for 10 seconds.

The graphs show their runs.



***11 (a)** Who runs the further distance? **[3 marks]**
You **must** show your working.

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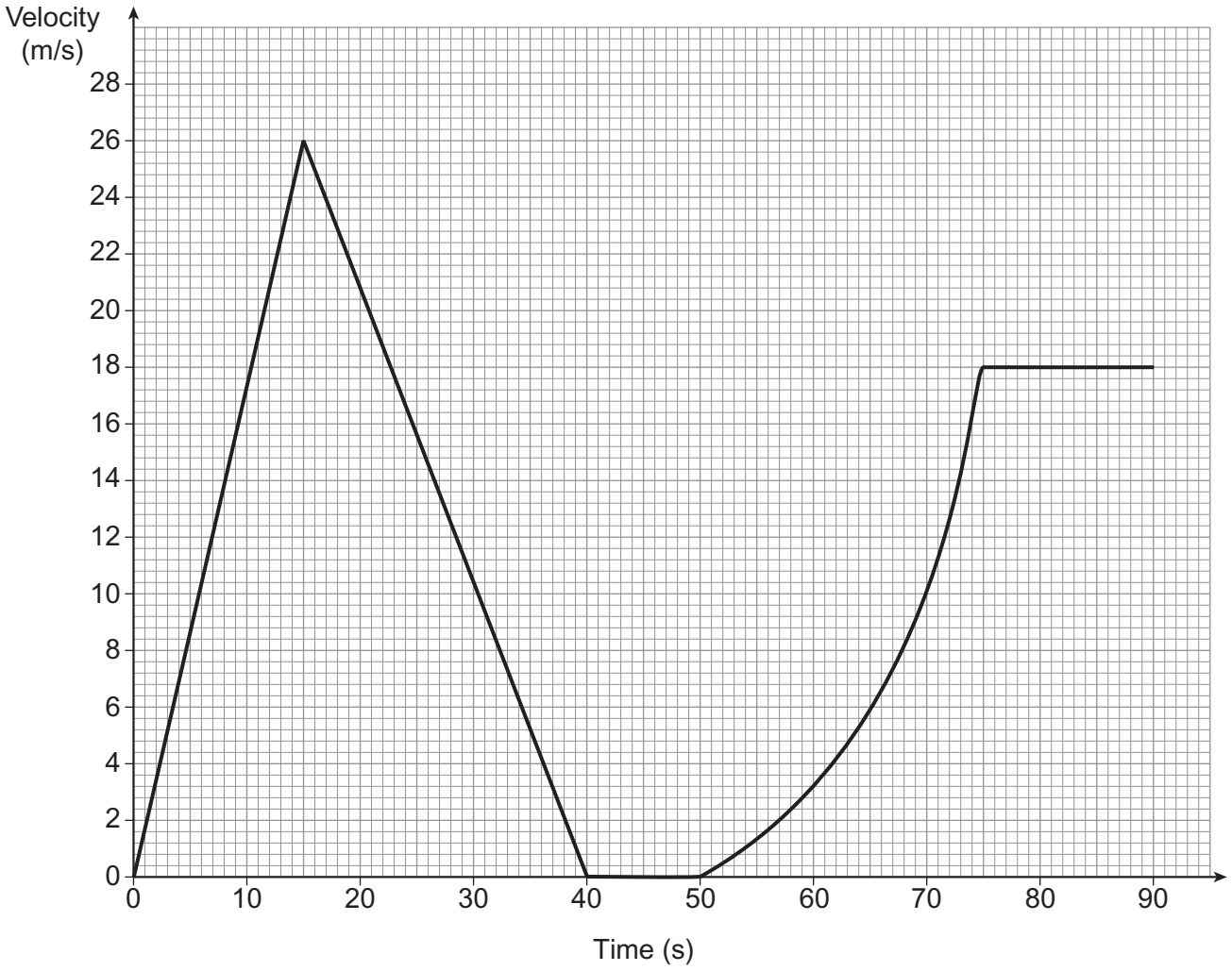
Answer ..... metres

11 (b) Work out Finn's acceleration.
State the units of your answer.

[3 marks]

Answer _____

12 The graph shows the velocity-time graph for the first 90 seconds of a car journey.



12 (a) Here is a statement about the first 40 seconds of the car journey.

When decelerating, the car travelled over 100 metres further than when accelerating.

Is the statement correct?
You **must** show your working.

[3 marks]

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12 (b) Estimate the acceleration of the car at 65 seconds.
You **must** show your working.

[3 marks]

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Answer ..... m/s^2