Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Travel and conversion graphs

Time allowed: 55 minutes

Subject code **0580**

Mathematics

Questions from Paper 1, Paper 2, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 46

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 46 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

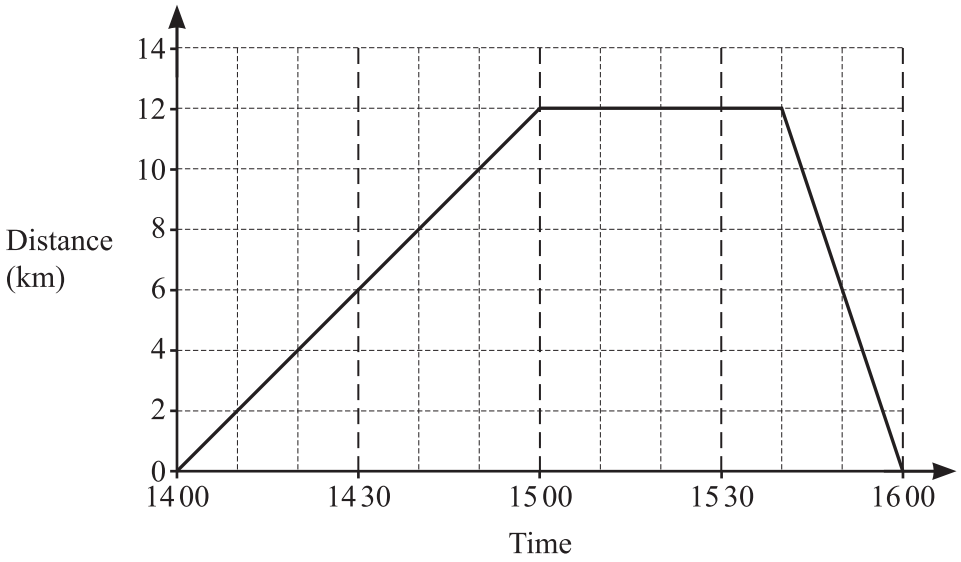
Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 The travel graph shows the journey of a bus.



(a) Find the distance the bus travels in the first 50 minutes.

..... km [1]

(b) Find how long, in minutes, the bus is stationary.

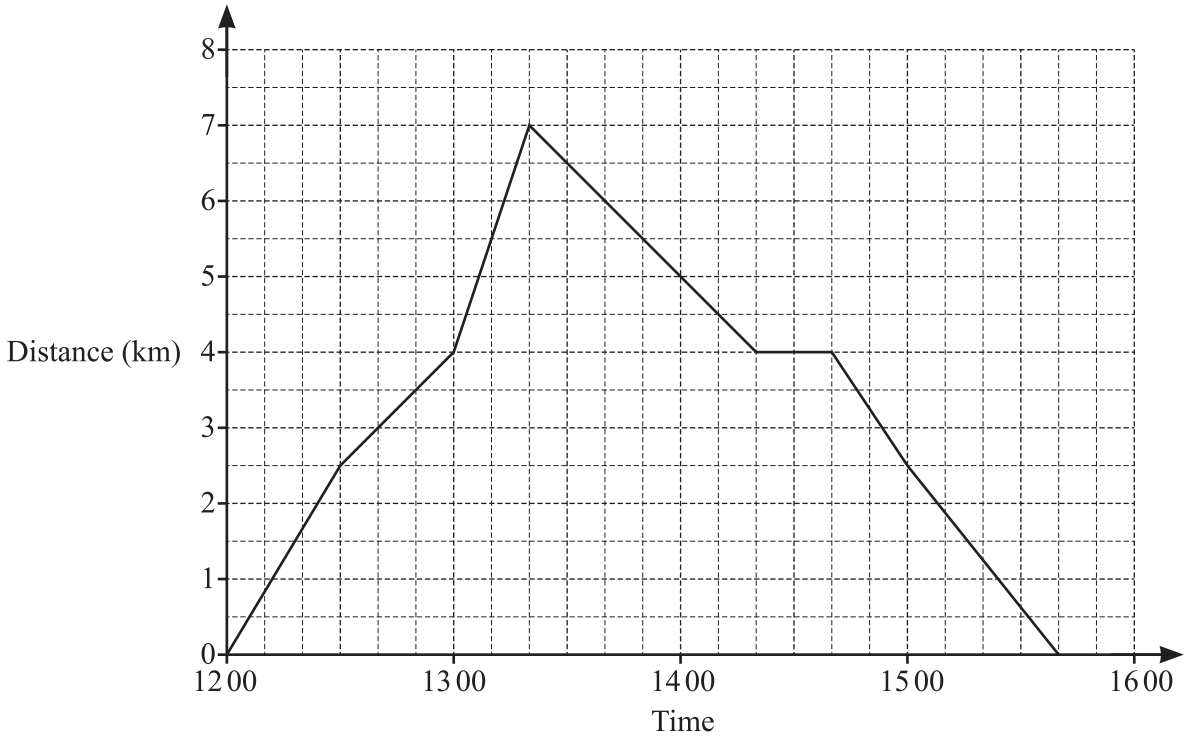
..... min [1]

(a) Distance-time graphs (b) Distance-time graphs Click for more variations

1(a)	10	**1**	
1(b)	40	**1**	

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2



The travel graph shows a student's journey.

(a) Explain what is happening between 14 20 and 14 40.

..... [1]

(b) Complete the statement.

The student is travelling fastest between the times ..... and .....

because ..... [2]

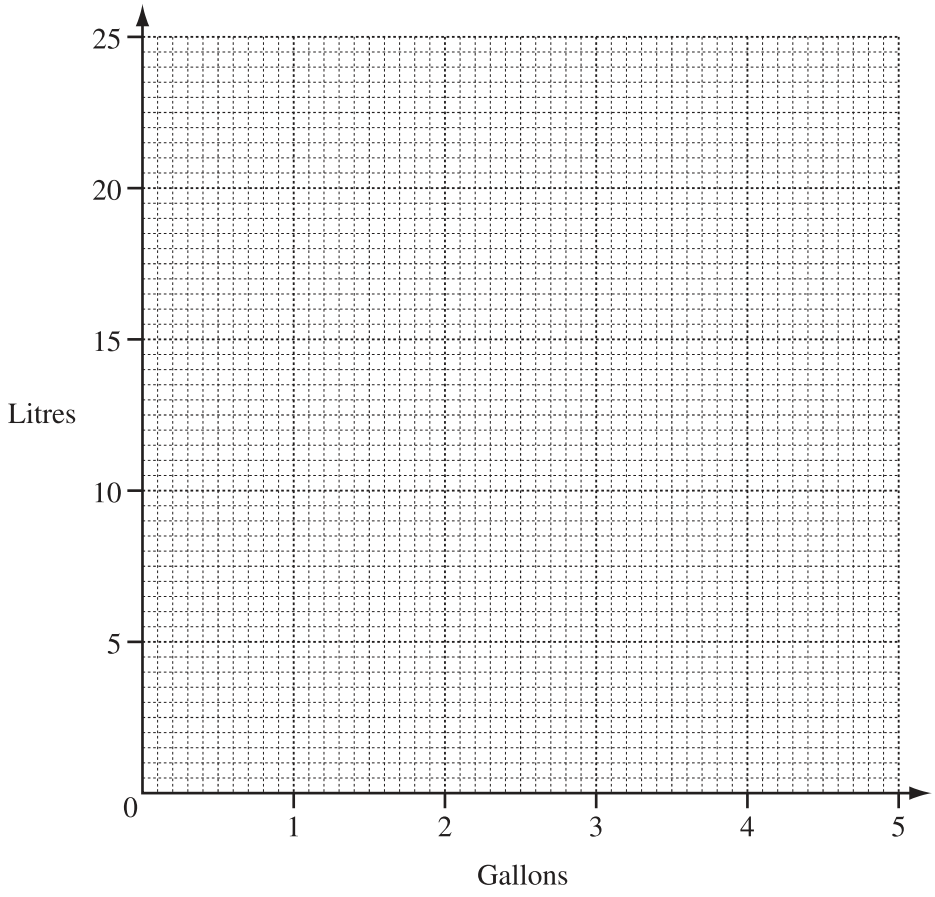
(a) Distance-time graphs (b) Distance-time graphs Click for more variations

2(a)	Student is stationary oe	**1**	
2(b)	13 00 13 20 gradient is steepest	**2**	**B1** for both times correct or correct reason

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3 Mario says that 5 gallons = 22.5 litres.

(a) On the grid, draw a straight line to show the conversion rate that Mario uses.



[2]

(b) Use your graph to find

(i) the number of litres equivalent to 4 gallons,

Answer(b)(i) ..... litres [1]

(ii) the number of gallons equivalent to 15 litres.

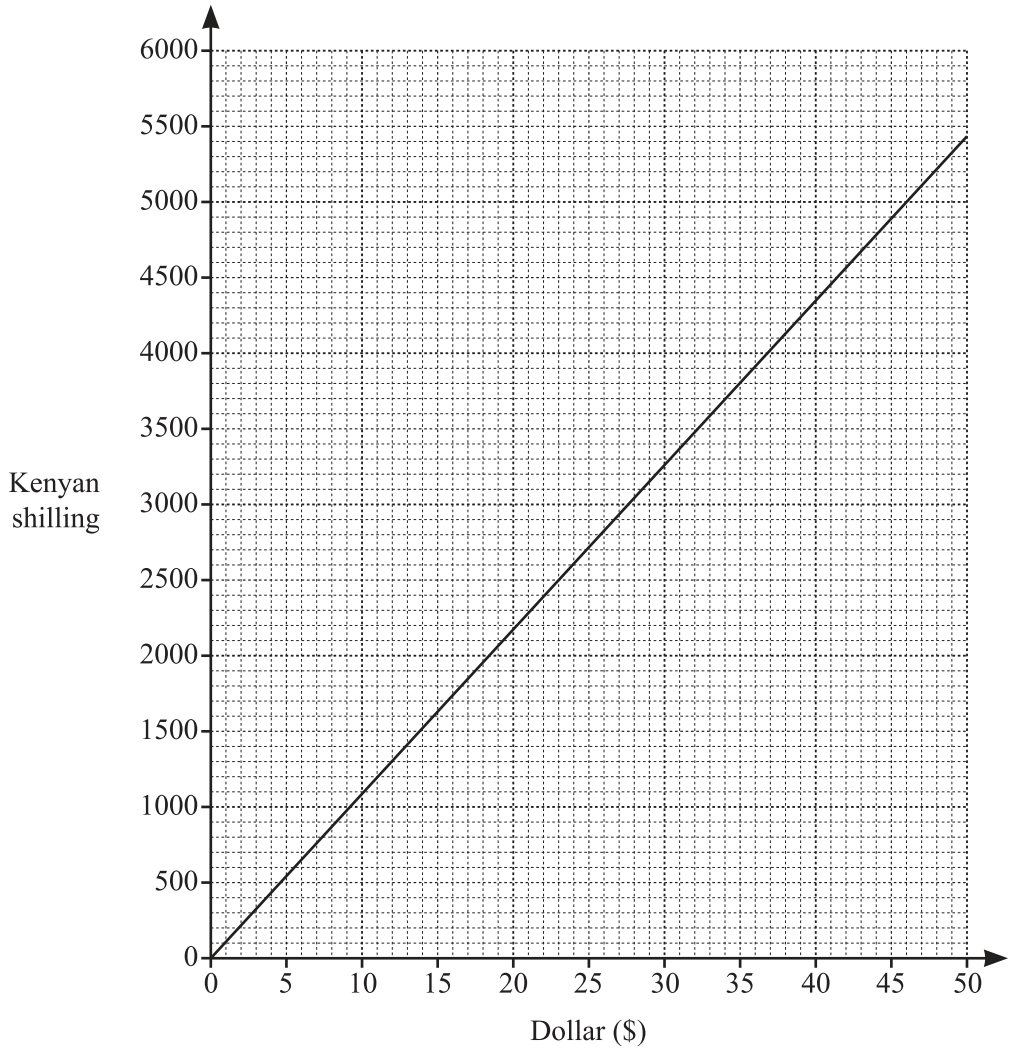
Answer(b)(ii) ..... gallons [1]

(a) Conversion graphs (b)(i) Conversion graphs (b)(ii) Conversion graphs Click for more variations

3	**(a)** Ruled line from (0, 0) to (5, 22.5)	**2**	**B1** for (5, 22.5) **or** (0, 0) at the ends of the ruled line.
	(b) **(i)** 17.5 to 18.5	**1FT**	FT *their* straight line
	(ii) 3.3 to 3.4	**1FT**	FT *their* straight line

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4 The diagram shows a conversion graph for dollars and Kenyan shillings.



(a) Use the graph to change 5000 shillings to dollars.

$..... [1]

(b) Explain how to use this graph to change $420 to shillings.

.....

..... [1]

(c) The exchange rate is now $1 = 90 shillings.

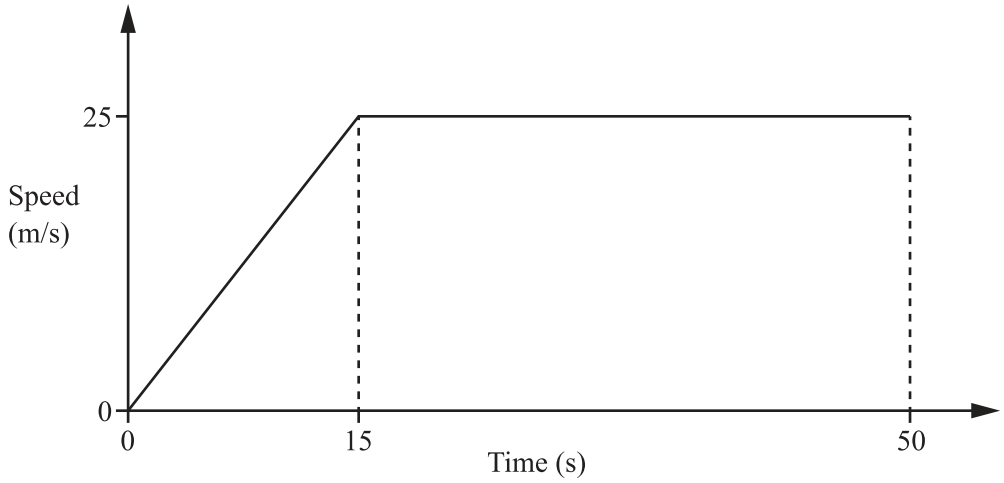
On the grid, draw another line to show this exchange rate. [2]

(a) Conversion graphs (b) Conversion graphs (c) Conversion graphs Click for more variations

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4(a)	46	**1**	
4(b)	appropriate explanation e.g. reading at 42 × 10 oe	**1**	accept any correct explanation
4(c)	correct ruled line	**2**	**B1** for any correct plotted point other than (0, 0)

5



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

Calculate

(a) the acceleration during the first 15 seconds,

..... m/s^2 [1]

(b) the distance travelled in the 50 seconds.

..... m [3]

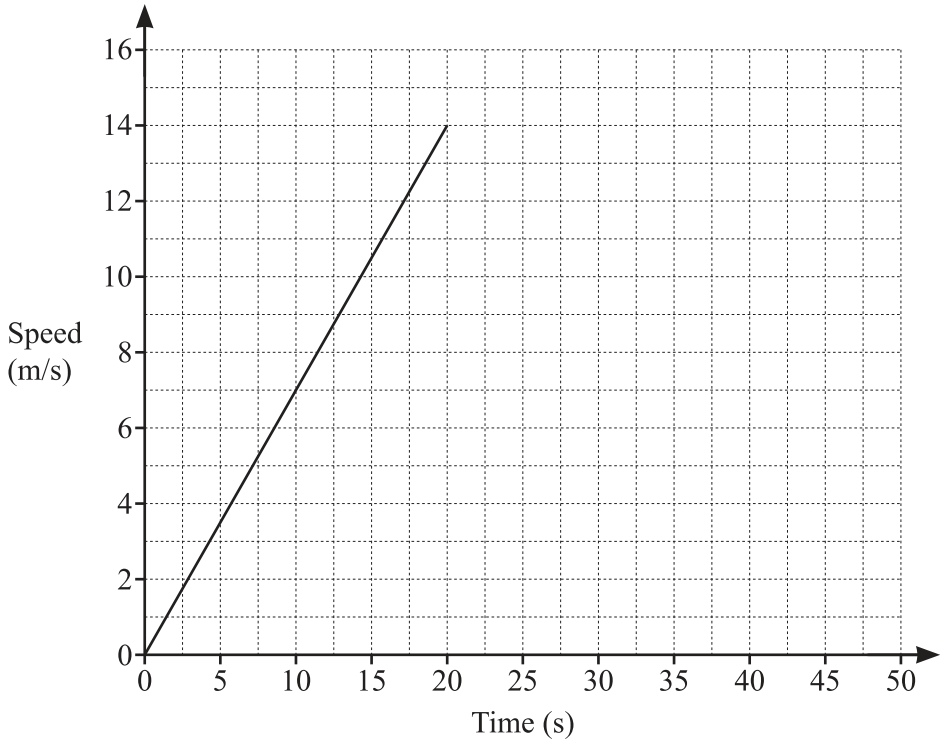
(a) Speed-time graphs (b) Speed-time graphs Click for more variations

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5(a)	$1\frac{2}{3}$ or 1.67 or 1.666 to 1.667	**1**	
5(b)	1062.5	**3**	**M2** for $\frac{25}{2}(50+35)$ oe or **M1** for one area

6 A car starts its journey by accelerating from rest at a constant rate of 0.7 m/s^2 for 20 seconds, before reaching a constant speed of 14 m/s.
It then travels at 14 m/s for a distance of 210 m.
The car then decelerates at a constant rate of 1.4 m/s^2, before coming to a stop.

On the grid, complete the speed–time graph for the car's journey.



[3]

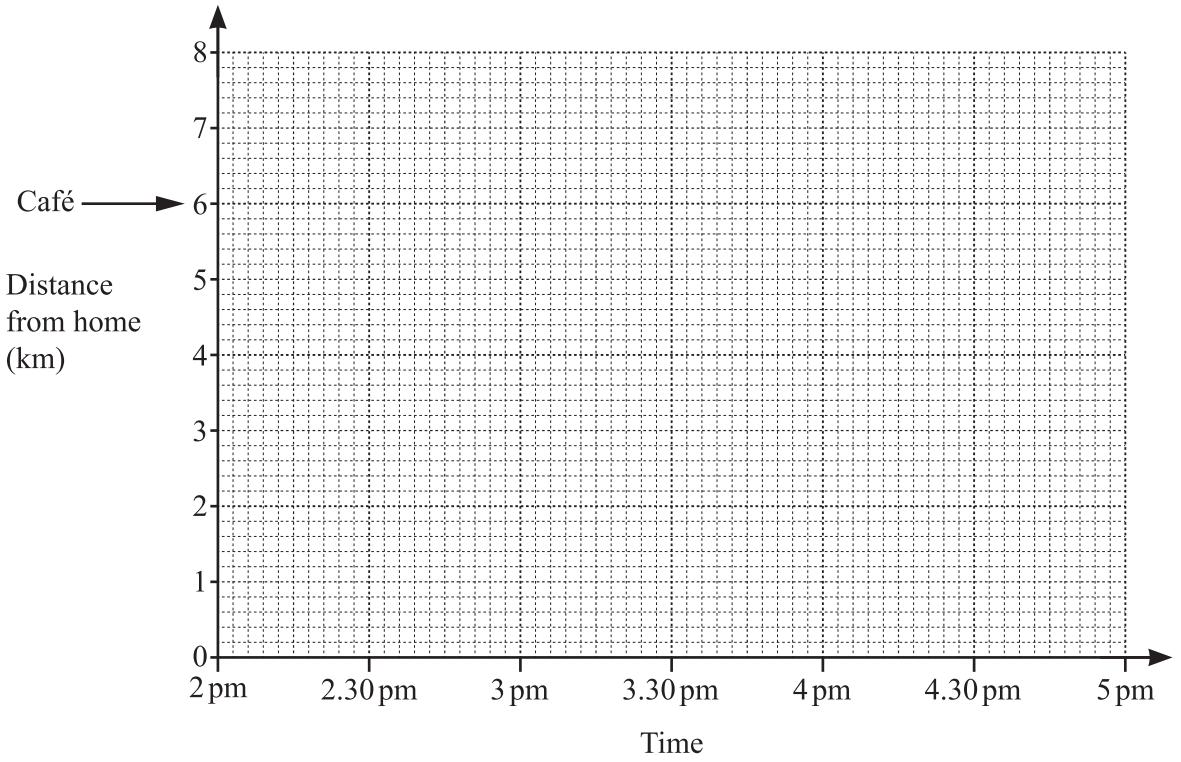
Speed-time graphs Click for more variations

6	Straight line from (20, 14) to (35, 14) and straight line from (35, 14) to (45, 0)	**3**	**M1** for 210 ÷ 14 soi **M1** for 14 ÷ 1.4 or any line with gradient –1.4 ending at *x* axis

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7 Samir leaves home at 2 pm.
He jogs 6 km to a café at a constant speed of 8 km per hour.
He stops to rest for 1 hour.
He then walks back home at a constant speed and arrives at 4.36 pm.

(a) On the grid, draw a travel graph to show Samir's whole journey.



[3]

(b) Calculate Samir's average speed for the **whole** journey.

..... km/h [3]

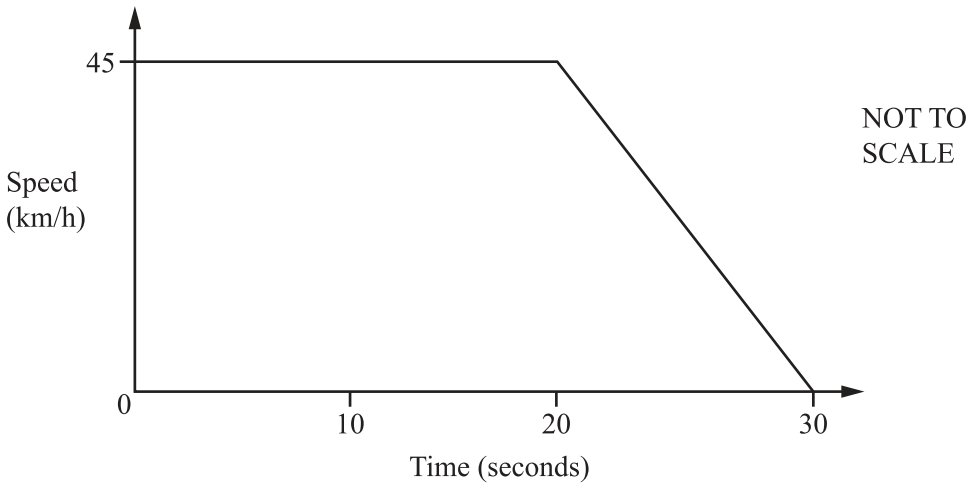
(a) Distance-time graphs (b) Distance-time graphs Click for more variations

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7(a)	Three correct ruled lines	**3**	**B1** for a line from (2pm, 0) to (2 45, 6) **B1FT** for a line from (*their* 2 45, *their* 6) to (*their* 2 45 + 1, *their* 6) **B1FT** for a line from (*their* 2 45 + 1, *their* 6) to (4 36, 0)
7(b)	4.62 or 4.615…	**3**	**M2** for $\frac{12}{156} \times 60$ oe or **M1** for 12 ÷ their time

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8



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.

Answer(a) ..... m/s [2]

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

Answer(b) ..... m/s^2 [1]

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

Answer(c) ..... m [3]

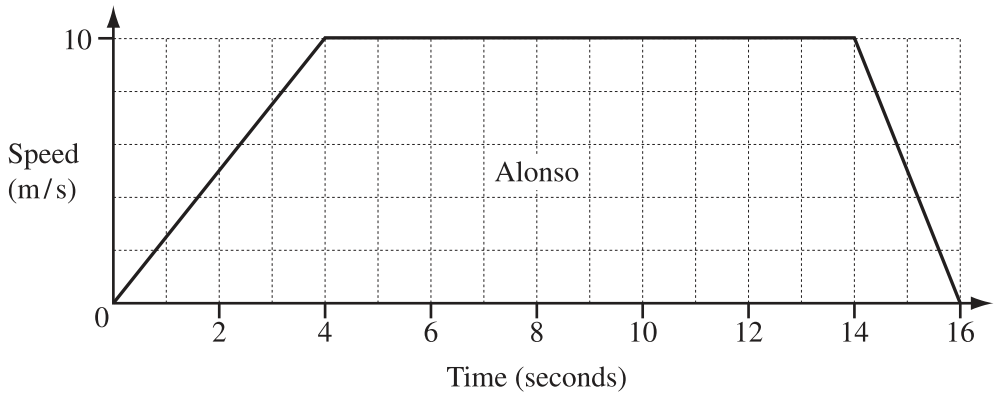
(a) Speed, density and pressure (b) Speed-time graphs (c) Speed-time graphs Click for more variations
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8 (a)	12.5 oe	**2**	**M1** for 45 × 1000 ÷ 60 ÷ 60 oe
(b)	1.25 oe	**1FT**	**FT** *their* **(a)** ÷ 10
(c)	312.5 oe	**3FT**	**FT** for 25 × *their* **(a)** **M2** for 20 × *their* 12.5 + 0.5 × 10 × *their* 12.5 oe or **M1** for one correct relevant area calculation or **SC2** for final answer 1125

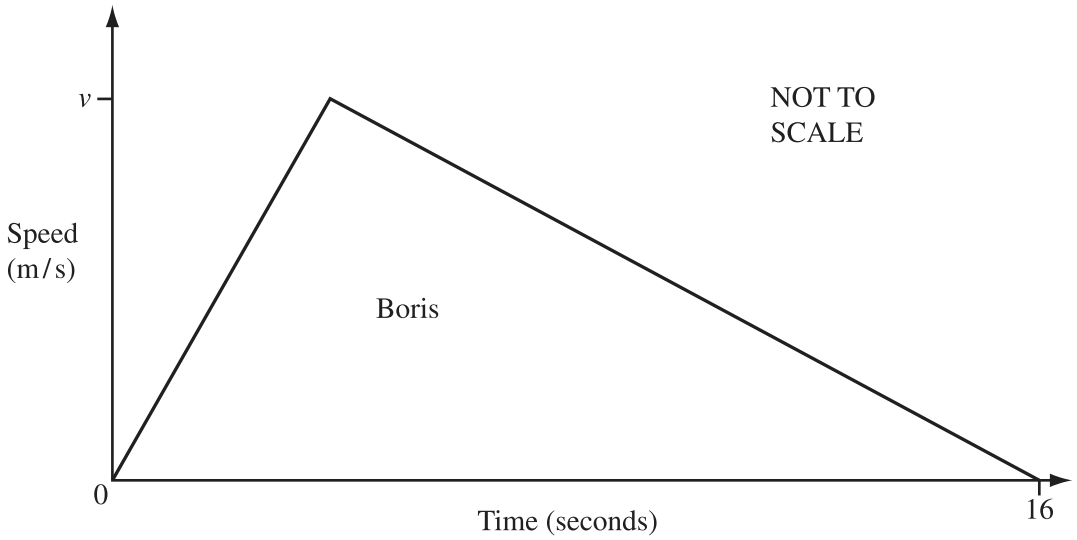
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9 The graphs show the speeds of two cyclists, Alonso and Boris.

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.

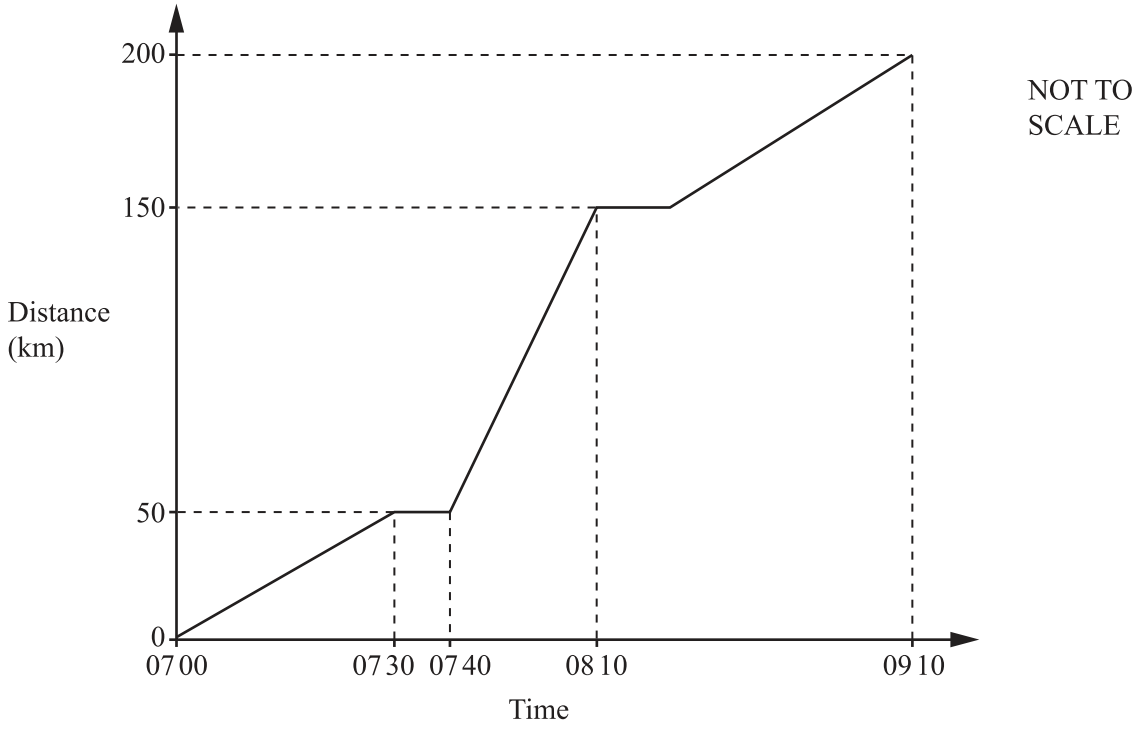
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Answer ..... m/s [5]

Speed-time graphs Click for more variations

9	$16\frac{1}{4}$ or 16.3	5	**M1** finding the area under graph **A1** 130 **M1** $\frac{1}{2} \times 16 \times v$ **M1** equating and solving

10 (a)



The distance-time graph shows the journey of a train.

(i) Find the speed of the train between 07 00 and 07 30.

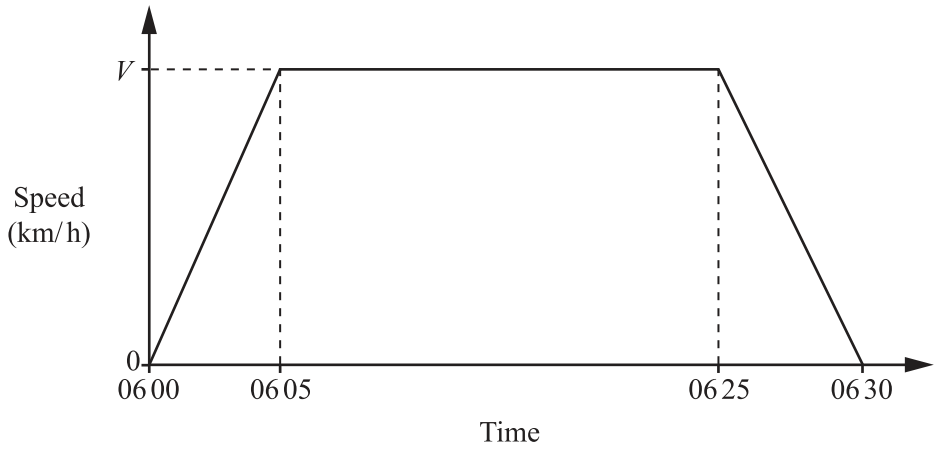
..... km/h [1]

(ii) Find the average speed for the whole journey.

..... km/h [3]

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(b)



The speed-time graph shows the first 30 minutes of another train journey.
The distance travelled is 100 km.
The maximum speed of the train is V km/h.

(i) Find the value of V.

$V =$ ..... [3]

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

..... m/s^2 [2]

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(a)(i) Distance-time graphs (a)(ii) Distance-time graphs (b)(i) Speed-time graphs (b)(ii) Speed-time graphs
Click for more variations

10(a)(i)	100	**1**	
10(a)(ii)	92.3 or 92.29… to 92.31	**3**	**M2** for $200 \div (2 + \frac{10}{60})$ oe or **M1** for $200 \div$ *their* time interval or **M1** for $\frac{10}{60}$ soi oe
10(b)(i)	240 nfww	**3**	**M2** for $\frac{V}{2}\left(\frac{30}{60} + \frac{20}{60}\right) = 100$ oe or **M1** for any correct relevant area seen in terms of V
10(b)(ii)	$\frac{2}{9}$ oe	**2FT**	**FT** for *their* **(b)(i)** $\div$ 1080 to 3 sf or better **M1** for *their* **(b)(i)** $\times \frac{1000}{3600}$ soi

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