

GCSE Grade 7

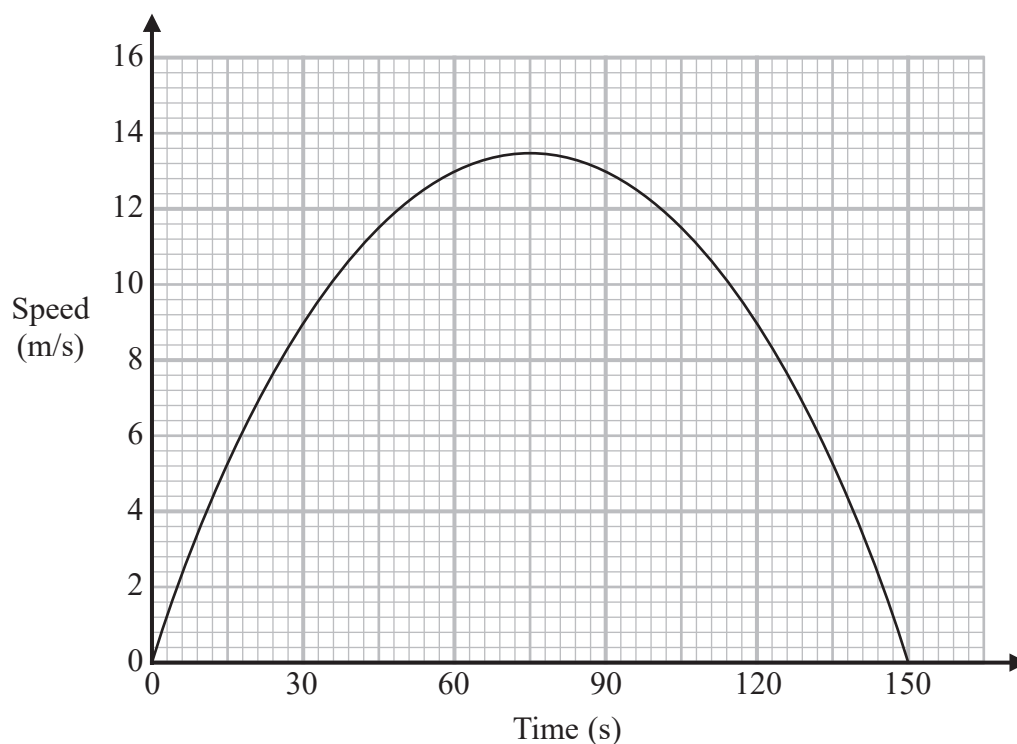
Maths

Booklet 6

Paper 3H
Calculator

www.ggmaths.co.uk

1 Here is a speed-time graph for a car.



(a) Work out an estimate for the distance the car travelled in the first 30 seconds.

..... m
(2)

(b) Is your answer to part (a) an underestimate or an overestimate of the actual distance the car travelled in the first 30 seconds?
Give a reason for your answer.

.....
.....
.....
(1)



Julian used the graph to answer this question.

Work out an estimate for the acceleration of the car at time 60 seconds.

Here is Julian's working.

$$\text{acceleration} = \text{speed} \div \text{time}$$

$$= 13 \div 60$$

$$= 0.21\dot{6} \text{ m/s}^2$$

Julian's method does not give a good estimate of the acceleration at time 60 seconds.

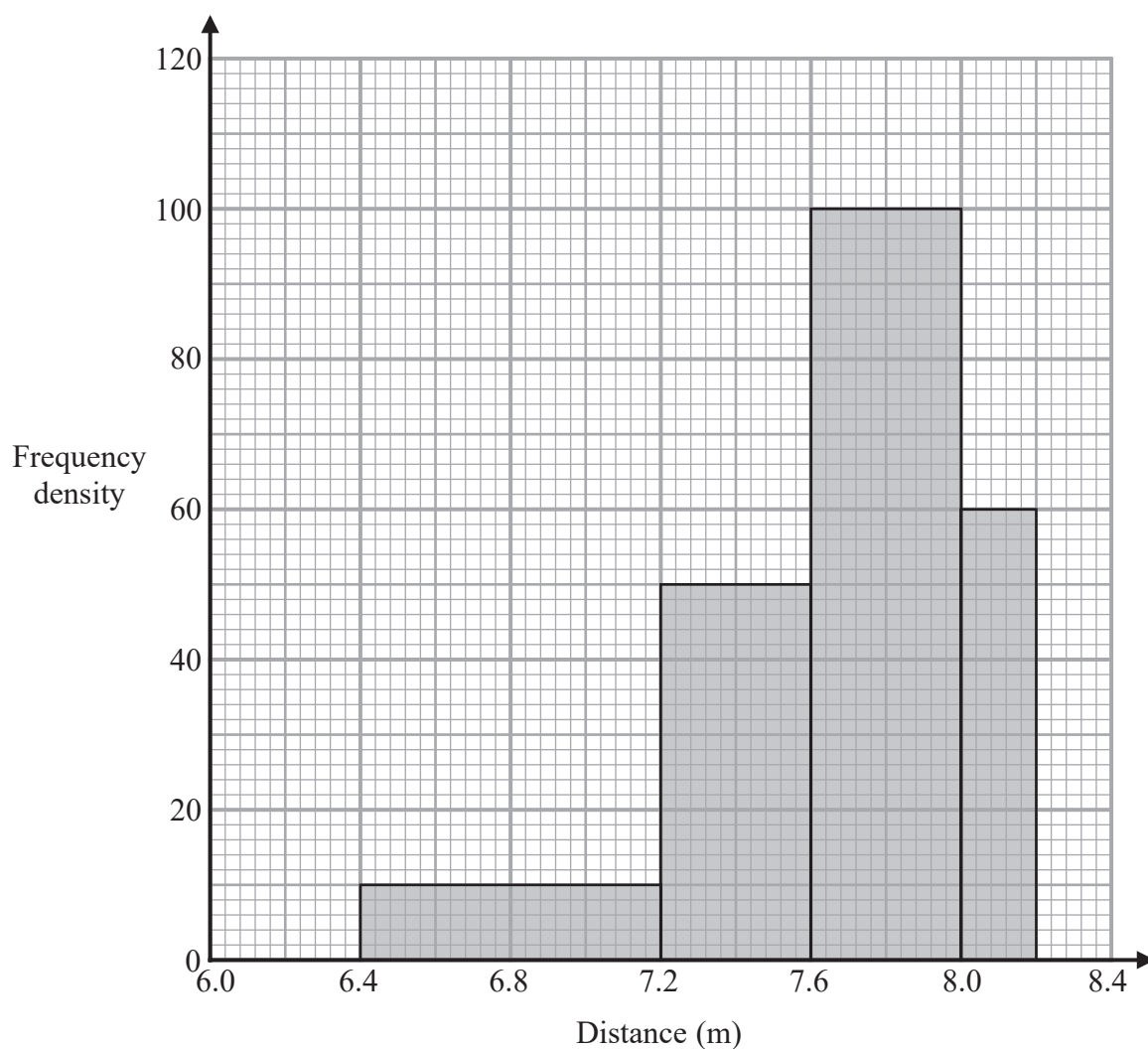
(c) Explain why.

(1)

(Total for Question 1 is 4 marks)



- 2 The histogram gives information about the distances 80 competitors jumped in a long jump competition.



Calculate an estimate for the mean distance.

..... m

(Total for Question 2 is 4 marks)



3 Here is a list of five numbers.

98^{53}

98^{64}

98^{73}

98^{88}

98^{91}

Find the lowest common multiple of these five numbers.

.....
(Total for Question 3 is 1 mark)



- 4 Write $x^2 + 6x - 7$ in the form $(x + a)^2 + b$ where a and b are integers.

(Total for Question 4 is 2 marks)

- 5 Cone **A** and cone **B** are mathematically similar.
The ratio of the volume of cone **A** to the volume of cone **B** is 27 : 8
The surface area of cone **A** is 297 cm^2
Show that the surface area of cone **B** is 132 cm^2

(Total for Question 5 is 3 marks)



6 (a) Show that the equation $x^3 + 7x - 5 = 0$ has a solution between $x = 0$ and $x = 1$

(2)

(b) Show that the equation $x^3 + 7x - 5 = 0$ can be arranged to give $x = \frac{5}{x^2 + 7}$

(2)

(c) Starting with $x_0 = 1$, use the iteration formula $x_{n+1} = \frac{5}{x_n^2 + 7}$ three times to find an estimate for the solution of $x^3 + 7x - 5 = 0$

(3)



- (d) By substituting your answer to part (c) into $x^3 + 7x - 5$,
comment on the accuracy of your estimate for the solution to $x^3 + 7x - 5 = 0$

(2)

(Total for Question 6 is 9 marks)

- 7 The petrol consumption of a car, in litres per 100 kilometres, is given by the formula

$$\text{Petrol consumption} = \frac{100 \times \text{Number of litres of petrol used}}{\text{Number of kilometres travelled}}$$

Nathan's car travelled 148 kilometres, correct to 3 significant figures.

The car used 11.8 litres of petrol, correct to 3 significant figures.

Nathan says,

“My car used less than 8 litres of petrol per 100 kilometres.”

Could Nathan be wrong?

You must show how you get your answer.

(Total for Question 7 is 3 marks)

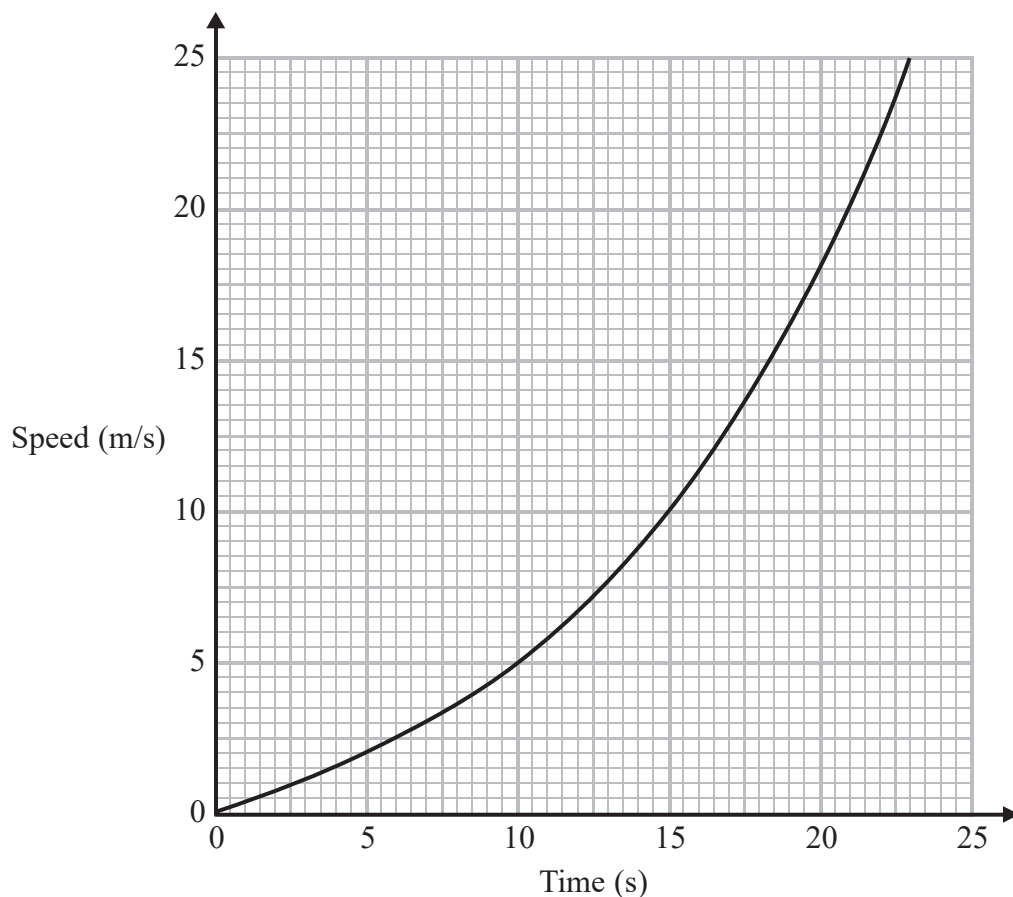


DO NOT WRITE IN THIS AREA

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8 Here is a speed-time graph for a train.



- (a) Work out an estimate for the distance the train travelled in the first 20 seconds.
Use 4 strips of equal width.

..... m
(3)

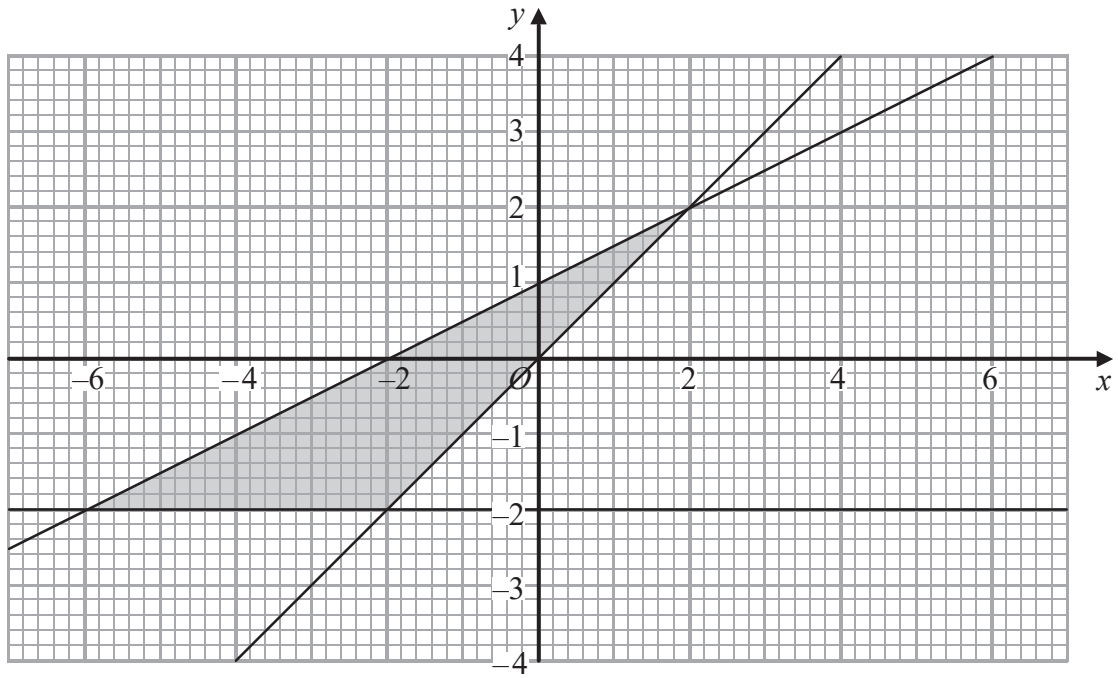
- (b) Is your answer to (a) an underestimate or an overestimate of the actual distance the train travelled?
Give a reason for your answer.

.....
.....
(1)

(Total for Question 8 is 4 marks)



9



Write down the three inequalities that define the shaded region.

.....

(Total for Question 9 is 4 marks)



P 5 0 5 4 9 A 0 1 3 2 0

10 Using $x_{n+1} = -2 - \frac{4}{x_n^2}$

with $x_0 = -2.5$

(a) find the values of x_1 , x_2 and x_3

$$x_1 = \dots\dots\dots$$

$$x_2 = \dots\dots\dots$$

$$x_3 = \dots\dots\dots$$

(3)

(b) Explain the relationship between the values of x_1 , x_2 and x_3 and the equation $x^3 + 2x^2 + 4 = 0$

(2)

(Total for Question 10 is 5 marks)

