

Level 3 Certificate

MATHEMATICAL STUDIES

Paper 1

Name: _____

Class: _____

Date: _____

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a clean copy of the Preliminary material
- a scientific calculator or a graphics calculator
- a copy of the formulae sheet
- a ruler.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in your name, class and the date at the top of this page.
- Answer all the questions.
- Do all rough work on this paper. Cross through any work that you do not want to be marked.
- In all calculations, show clearly how you work out your answer.
- The final answer to questions should be given to an appropriate degree of accuracy.
- You may not refer to the copy of the Preliminary material that was available prior to this examination. A clean copy is enclosed for your use.

Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
Total	

Information

- The maximum mark for this paper is 60.
- The marks for each question are shown in brackets [].
- Use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Paper 1

1 The numbers of cars licensed in Great Britain in 2014 were as shown in the table.

Numbers in thousands

Petrol	Diesel	Other	Total
19054	11209	251	30513

a) Explain why the individual numbers do not add up to the total.

[1 mark]

b) A student intends to analyse the annual running costs of a car and decides to choose two cars of each type for the study.

i Give **two** reasons why this would not be a good sample to take.

[2 marks]

ii Give a full description of a better sampling method that could be used.

[4 marks]

5 Use **Taxation 2015–16** from the Preliminary Material.

The spreadsheet shown below is used for the PAYE tax on 30th June 2016 for an employee of a company who has an annual salary of £24 000.

The Tax code shows that the employee has a tax-free allowance of £10 600. The Tax to date shows the total tax paid in April, May and June 2015.

	A	B	C	D
1	Monthly salary	£2000	PAYE Tax	
2	Tax period	3	Tax to date	
3	Tax code	1060L		

a) What do the letters PAYE stand for?

[1 mark]

b) Calculate the value in cell D1.

[5 marks]

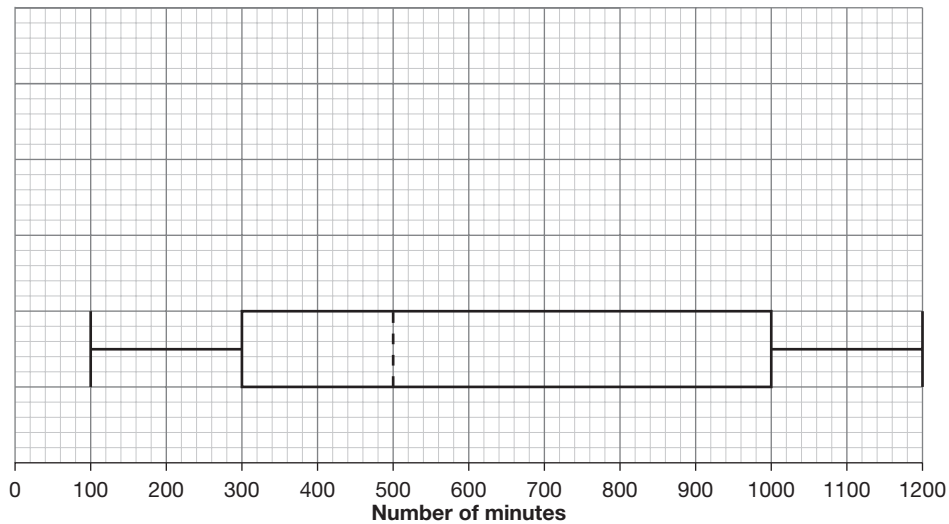
c) Write down a formula which gives the value in cell D2.

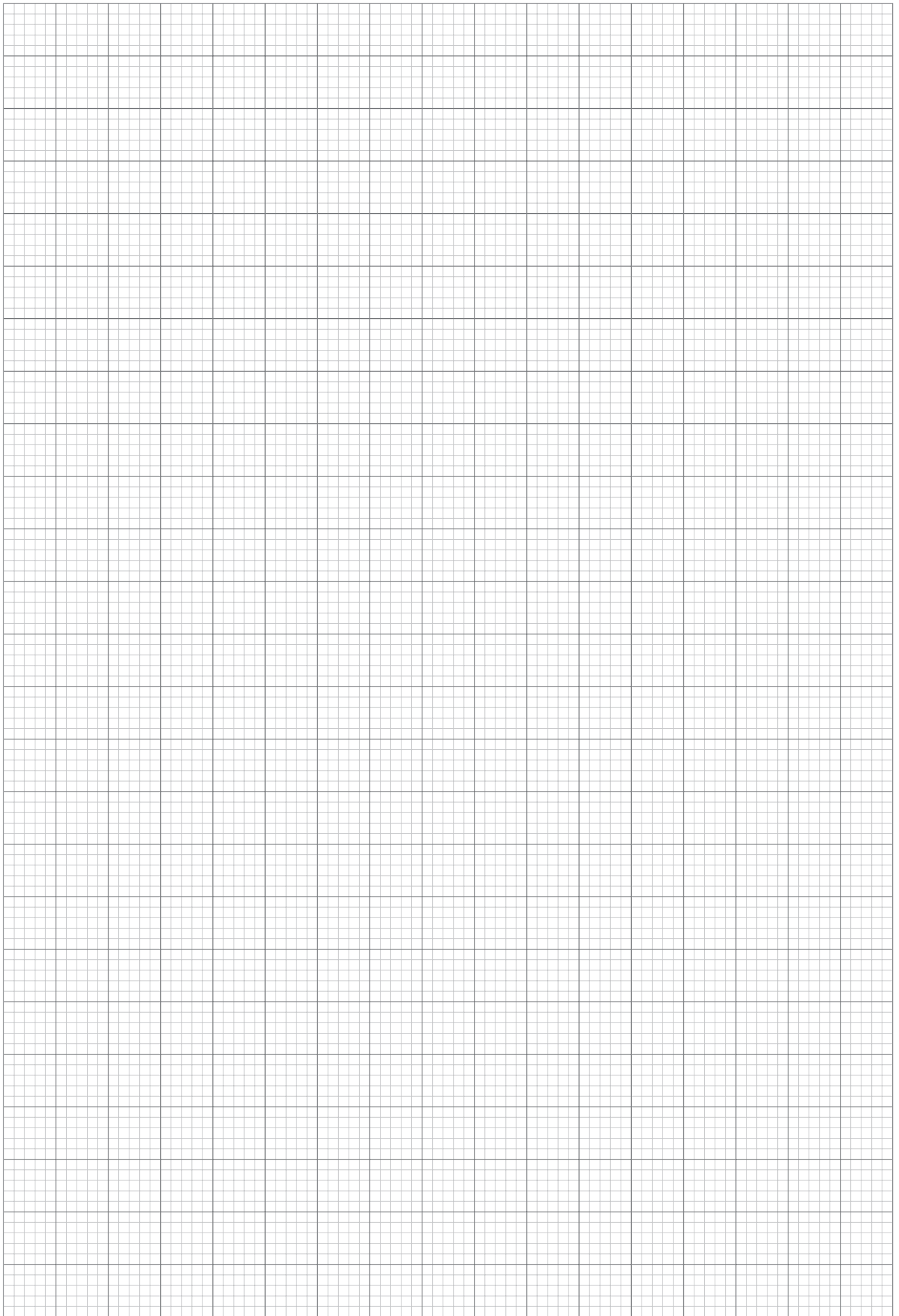
[1 mark]

- 6 A newspaper asked its readers how much time they spent playing video games each week. The responses of those who played video games are shown below. The least time was 20 minutes and the greatest time was 900 minutes.

Length of time, t minutes	Number of readers
$0 \leq t < 20$	0
$20 \leq t < 60$	15
$60 \leq t < 120$	18
$120 \leq t < 300$	25
$300 \leq t < 600$	11
$600 \leq t < 1000$	11
$1000 \leq t$	0

The results of a similar survey of the readers of a magazine are shown as a box and whisker diagram below.





7 Karl borrows £2000 at an APR of 15%.

He pays back the loan in two equal instalments, one at the end of the first year and a final instalment at the end of the second year.

a) In the formula

$$C = \sum_{k=1}^2 \left(\frac{A}{(1+i)^{t_k}} \right),$$

state the values of C , t_1 , t_2 and i .

[4 marks]

b) Find the value of each instalment.

[4 marks]
