

Write your name here

Surname

Other names

Pearson Edexcel
Level 3 GCE

Centre Number

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Candidate Number

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Mathematics

Advanced Subsidiary Paper 1: Pure Mathematics

Sample Assessment Material for first teaching September 2017

Time: 2 hours

Paper Reference

8MA0/01

You must have:

Mathematical Formulae and Statistical Tables, calculator

Total Marks

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Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for algebraic manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** the questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 17 questions in this question paper. The total mark for this paper is 100.
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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5. Given that

$$f(x) = 2x + 3 + \frac{12}{x^2}, \quad x > 0$$

show that $\int_1^{2\sqrt{2}} f(x) dx = 16 + 3\sqrt{2}$

(5)

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(Total for Question 5 is 5 marks)

10. The equation $kx^2 + 4kx + 3 = 0$, where k is a constant, has no real roots.

Prove that

$$0 \leq k < \frac{3}{4} \quad (4)$$

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(Total for Question 10 is 4 marks)

14.

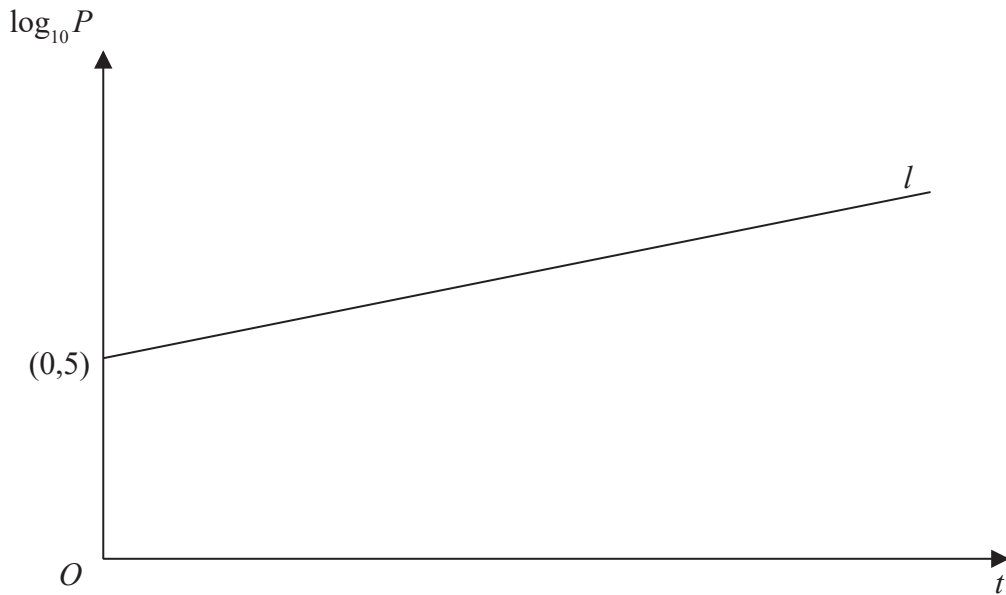


Figure 2

A town's population, P , is modelled by the equation $P = ab^t$, where a and b are constants and t is the number of years since the population was first recorded.

The line l shown in Figure 2 illustrates the linear relationship between t and $\log_{10} P$ for the population over a period of 100 years.

The line l meets the vertical axis at $(0, 5)$ as shown. The gradient of l is $\frac{1}{200}$.

- (a) Write down an equation for l . (2)
- (b) Find the value of a and the value of b . (4)
- (c) With reference to the model interpret
- (i) the value of the constant a ,
 - (ii) the value of the constant b . (2)
- (d) Find
- (i) the population predicted by the model when $t = 100$, giving your answer to the nearest hundred thousand,
 - (ii) the number of years it takes the population to reach 200 000, according to the model. (3)
- (e) State two reasons why this may not be a realistic population model. (2)

