

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel**  
**International**  
**Advanced Level**

Centre Number

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Candidate Number

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Sample Assessment Materials for first teaching September 2018

(Time: 1 hour 30 minutes)

Paper Reference **WMA13/01**

**Mathematics**  
**International Advanced Level**  
**Pure Mathematics P3**

**You must have:**

Mathematical Formulae and Statistical Tables, calculator

Total Marks

**Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra 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** 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.
- Inexact answers should be given to three significant figures unless otherwise stated.

### Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 10 questions in this question paper. The total mark for this paper is 75.
- 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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**Answer ALL questions. Write your answers in the spaces provided.**

1. Express

$$\frac{6x + 4}{9x^2 - 4} - \frac{2}{3x + 1}$$

as a single fraction in its simplest form.

**(4)**

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**Question 1 continued**

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**(Total for Question 1 is 4 marks)**

**Q1**



### Question 2 continued

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### Question 2 continued

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**Question 2 continued**

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**(Total for Question 2 is 8 marks)**

**Q2**





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Question 3 continued

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(Total for Question 3 is 5 marks)

Q3

Mark box for Question 3.



### Question 4 continued

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### Question 4 continued

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**Question 4 continued**

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**(Total for Question 4 is 7 marks)**

**Q4**

5. Given that

$$y = \frac{5x^2 - 10x + 9}{(x - 1)^2} \quad x \neq 1$$

show that  $\frac{dy}{dx} = \frac{k}{(x - 1)^3}$ , where  $k$  is a constant to be found.

(6)

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**Question 5 continued**

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**Q5**

**(Total for Question 5 is 6 marks)**





### Question 6 continued

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**(Total for Question 6 is 14 marks)**



### Question 7 continued

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### Question 7 continued

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**(Total for Question 7 is 7 marks)**

8. In a controlled experiment, the number of microbes,  $N$ , present in a culture  $T$  days after the start of the experiment were counted.

$N$  and  $T$  are expected to satisfy a relationship of the form

$$N = aT^b \quad \text{where } a \text{ and } b \text{ are constants}$$

- (a) Show that this relationship can be expressed in the form

$$\log_{10} N = m \log_{10} T + c$$

giving  $m$  and  $c$  in terms of the constants  $a$  and/or  $b$ .

(2)

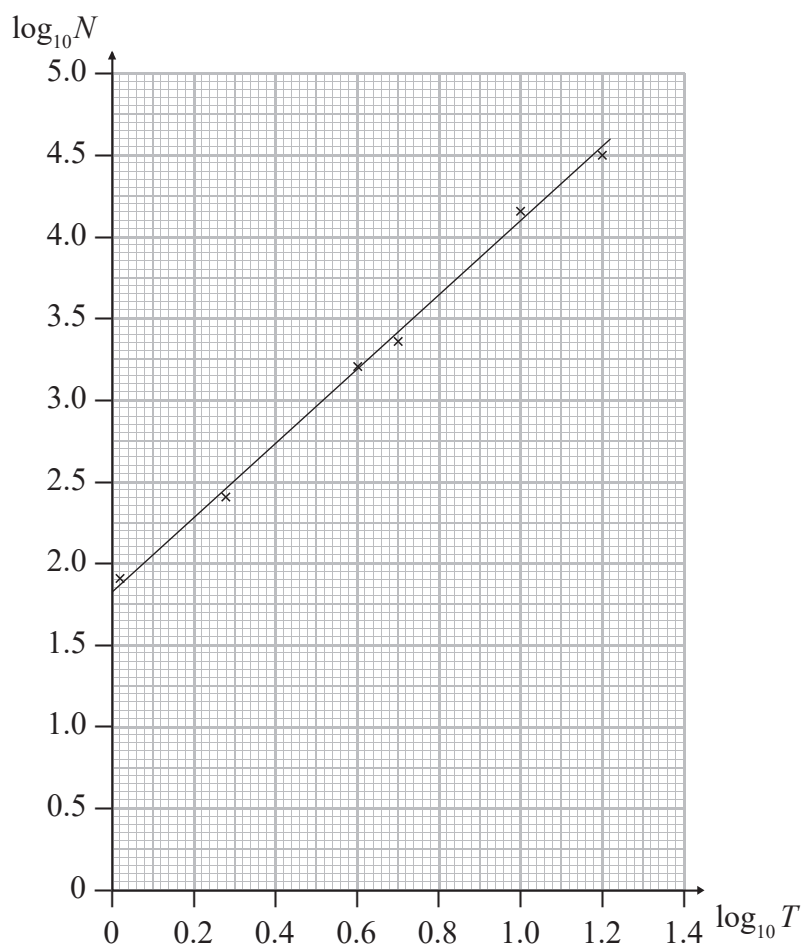


Figure 2

Figure 2 shows the line of best fit for values of  $\log_{10} N$  plotted against values of  $\log_{10} T$

- (b) Use the information provided to estimate the number of microbes present in the culture 3 days after the start of the experiment.

(4)

- (c) With reference to the model, interpret the value of the constant  $a$ .

(1)



### Question 8 continued

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**Question 8 continued**

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**Q8**

**(Total for Question 8 is 7 marks)**



**Question 9 continued**

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**Question 9 continued**

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**(Total for Question 9 is 9 marks)**

**Q9**

- (4)



Question 10 continued

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**Question 10 continued**

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**(Total for Question 10 is 8 marks)**

**TOTAL FOR PAPER IS 75 MARKS**

**Q10**