

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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**Monday 18 January 2021**

Morning (Time: 1 hour 30 minutes)

Paper Reference **WMA12/01**

**Mathematics**

**International Advanced Subsidiary/Advanced Level**  
**Pure Mathematics P2**

**You must have:**

Mathematical Formulae and Statistical Tables (Lilac), 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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Pearson



Question 1 continued

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Question 1 continued

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Question 1 continued

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(Total 6 marks)

Q1



$$y = x^3 - x^2 - 16x + 2$$

- (a) Using calculus, find the  $x$  coordinates of the stationary points of the curve. (4)
- (b) Justify, by further calculus, the nature of all of the stationary points of the curve. (3)

Question 2 continued

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(Total 7 marks)

Q2



3. (i) Solve

$$7^{x+2} = 3$$

giving your answer in the form  $x = \log_7 a$  where  $a$  is a rational number in its simplest form.

(3)

(ii) Using the laws of logarithms, solve

$$1 + \log_2 y + \log_2 (y + 4) = \log_2 (5 - y)$$

(5)

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Question 3 continued

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Q3



- (4)

Question 4 continued

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Question 4 continued

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Question 4 continued

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(Total 8 marks)

Q4

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5. (i) Use algebra to prove that for all  $x \geq 0$

$$3x + 1 \geq 2\sqrt{3x}$$

(3)

- (ii) Show that the following statement is not true.

“The sum of three consecutive prime numbers is always a multiple of 5”

(1)

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Question 5 continued

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Q5







**Question 6 continued**

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Question 6 continued

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Question 6 continued

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(Total 8 marks)

Q6

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7.

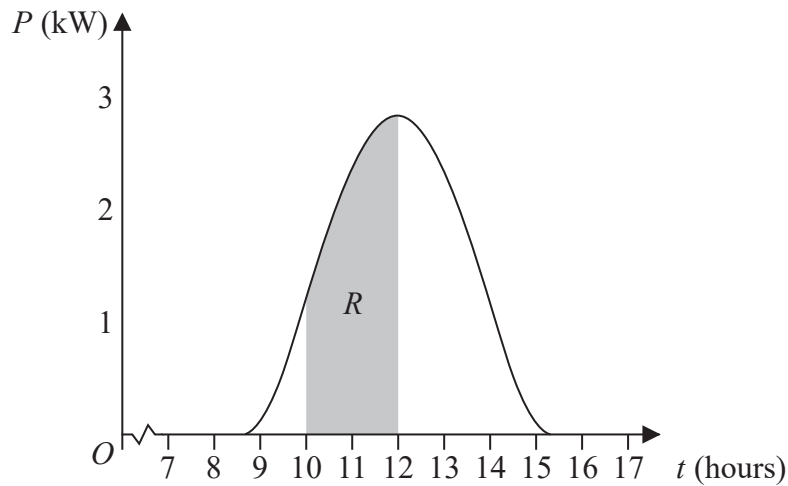


Figure 1

Solar panels are installed on the roof of a building.

The power,  $P$ , produced on a particular day, in kW, can be modelled by the equation

$$P = 0.95 + 2^{t-12} + 2^{12-t} - (t-12)^2 \quad 8.5 \leq t \leq 15.2$$

where  $t$  is the time in hours after midnight. The graph of  $P$  against  $t$  is shown in Figure 1.

A table of values of  $t$  and  $P$  is shown below, with the values of  $P$  given to 4 significant figures where appropriate.

Time, $t$ (hours)	10	10.5	11	11.5	12
Power, $P$ (kW)		1.882	2.45		2.95

- (a) Use the given equation to complete the table, giving the values of  $P$  to 4 significant figures where appropriate.

(2)

The amount of energy, in kWh, produced between 10:00 and 12:00 can be found by calculating the area of region  $R$ , shown shaded in Figure 1.

- (b) Use the trapezium rule, with all the values of  $P$  in the completed table, to find an estimate for the amount of energy produced between 10:00 and 12:00. Give your answer to 2 decimal places.

(4)



Question 7 continued

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Q7

(Total 6 marks)



$$a_1 = p - 3$$

(b) find the possible values of  $a_2$  (6)

Question 8 continued

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Question 8 continued

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(Total 7 marks)

Q8

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Question 9 continued

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Q9

(Total 10 marks)





Question 10 continued

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Q10

Question 10 continued

Handwriting practice lines for Question 10 continued.

(Total 11 marks)

TOTAL FOR PAPER IS 75 MARKS

END

