

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Thursday 7 January 2021

Morning (Time: 1 hour 30 minutes)

Paper Reference **WMA14/01**

Mathematics

International Advanced Subsidiary/Advanced Level
Pure Mathematics P4

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 ►

P67754A

©2021 Pearson Education Ltd.

1/1/1/1/



Pearson

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 1 continued

Handwriting practice area with 30 horizontal lines.

(Total 7 marks)

Q1



A diagram of a parallelogram with vertices labeled A, B, C, and D. Vertex A is at the bottom-left, B is at the top-left, C is at the top-right, and D is at the bottom-right. The sides AB and DC are parallel, and the sides AD and BC are parallel.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 2 continued

Handwriting practice area with 28 horizontal lines.

(Total 5 marks)

Q2



3. Prove by contradiction that there is no greatest odd integer.

(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 3 continued

Lined area for writing the answer to Question 3.

(Total 2 marks)

Q3





DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 4 continued

Lined area for writing the answer to Question 4.

(Total 7 marks)

Q4



5. In this question you should show all stages of your working.
Solutions relying on calculator technology are not acceptable.

Using the substitution $u = 3 + \sqrt{2x - 1}$ find the exact value of

$$\int_1^{13} \frac{4}{3 + \sqrt{2x - 1}} dx$$

giving your answer in the form $p + q \ln 2$, where p and q are integers to be found.

(8)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

Leave
blank

Question 5 continued

Lined area for writing the answer to Question 5.

(Total 8 marks)

Q5



DO NOT WRITE IN THIS AREA

Leave
blank

Question 6 continued

Blank lined area for writing the answer to Question 6.

(Total 9 marks)

Q6



Question 7 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 7 continued

Lined area for writing the answer to Question 7.

(Total 7 marks)

Q7



8. With respect to a fixed origin O , the lines l_1 and l_2 are given by the equations

$$l_1 : \mathbf{r} = \begin{pmatrix} -1 \\ 5 \\ 4 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ -1 \\ 5 \end{pmatrix} \quad l_2 : \mathbf{r} = \begin{pmatrix} 2 \\ -2 \\ -5 \end{pmatrix} + \mu \begin{pmatrix} 4 \\ -3 \\ b \end{pmatrix}$$

where λ and μ are scalar parameters and b is a constant.

Prove that for all values of $b \neq 7$, the lines l_1 and l_2 are skew.

(6)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Leave
blank

Question 8 continued

Lined area for writing the answer to Question 8.

(Total 6 marks)

Q8



A Cartesian coordinate system with a horizontal x-axis and a vertical y-axis. The origin is labeled O . The x-axis is labeled x at its right end, and the y-axis is labeled y at its top end. A curve starts at the origin O , rises to a peak, and then descends. The area under this curve from $x = 0$ to $x = \sqrt{3}$ is shaded in gray. A vertical line segment is drawn at $x = \sqrt{3}$ from the x-axis to the curve. The point $\sqrt{3}$ is labeled on the x-axis.

Question 9 continued

Lined area for writing the answer to Question 9.

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

DO NOT WRITE IN THIS AREA

Leave
blank

Question 9 continued

Lined area for writing the answer to Question 9.

(Total 10 marks)

Q9



- (d) State the value of the constant k . **(1)**

Question 10 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

[illegible]

Question 10 continued

Lined area for writing the answer to Question 10.

DO NOT WRITE IN THIS AREA



Leave
blank

Question 10 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Q10

(Total 14 marks)

TOTAL FOR PAPER IS 75 MARKS

END

