Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 Investigation (Core) **May/June 2025**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly, including sketches, to gain full marks for correct methods.
- In this paper you will be awarded marks for providing full reasons, examples and steps in your working to communicate your mathematics clearly and precisely.

INFORMATION

- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **8** pages.

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[Turn over

INVESTIGATION PRODUCTS OF PAIRS

In this investigation you will look at the differences between the products of pairs of numbers in an increasing linear sequence of positive numbers.

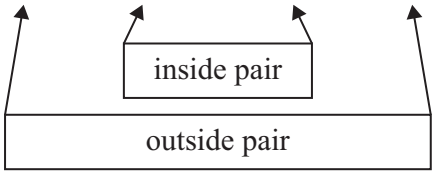
In each sequence:

- there are 4 terms
- the difference between each term is the *increase*
- the first term and the last term are the *outside pair*
- the middle two terms are the *inside pair*.

To find the *product difference* multiply the numbers in each pair and find the difference.

Example

The sequence is 1 2 3 4



Product of inside pair $2 \times 3 = 6$
Product of outside pair $1 \times 4 = 4$

Product difference $6 - 4 = 2$

1 (a) (i) The sequence is 5, 6, 7, 8.

Complete the statements.

Product of inside pair $6 \times \ldots\ldots = 42$

Product of outside pair $5 \times \ldots\ldots = 40$

Product difference $42 - 40 = 2$

[2]

(ii) Each sequence in this question has 4 terms.
In these sequences the increase is 1.

Complete the table.

Sequence	Product of inside pair	Product of outside pair	Product difference
1, 2, 3, 4	2 × 3 = 6	1 × 4 = 4	6 – 4 = 2
10 11, 12, 13	11 × 12 = ...	10 × 13 = 130	..... – 130 = ...
16, 17, ..., ...	17 × ..... = 306	16 × ..... = 304	306 – 304 = 2
....., 25, 26, ...	25 × 26 = 650	..... × ..... = ...	650 – ..... = ...
....., ..., ..., 101	..... × ..... = ...	..... × 101 = ...	..... – ..... = ...

[6]

(b) (i) Show that the product difference for this sequence is 2.

499, 500, 501, 502

[2]

(ii) Complete this sequence of decimals with an increase of 1.
Find the product difference.

2.5, 3.5, ..., ...

Product difference .....

[3]

(c) (i) Complete the statement.

For a sequence of ..... terms the product difference is always ..... [1]

(ii) These are expressions for the 4 terms of a sequence.

$a, \quad a+1, \quad a+2, \quad a+3$ where a can be any number

Show algebraically that your statement in **part (c)(i)** is true.

[4]

2 Each sequence in this question has 4 terms.
In these sequences the increase is more than 1.

(a) (i) Complete the table.

Sequence				Increase	Product of		Product difference
					inside pair	outside pair	
1,	3,	5,	7	2	15	7	8
6,	8,	..... ,	12	2	.....	72	.....
7.2,	10.2,	..... ,	.....	.....	134.64	.....	18
20,	..... ,	28,	.....	4	.....	640	.....
88,	..... ,	..... ,	100	.....	.....	8800	.....

[5]

(ii) A sequence has an increase of 5.
The product of the inside pair is 6000.

Find the 4 terms in the sequence.

..... , ... , ... , ... [3]

(b) (i) Complete the table.
Use your answers in **part (a)** to help you.

Increase, n	Product difference
1	2
2	8
3	18
4	
5	50
6	

[2]

(ii) Find an expression, in terms of n, for the product difference.

..... [2]

(c) (i) A sequence has an increase of 11.

Use your expression in **part (b)(ii)** to find the product difference for this sequence.

..... [2]

(ii) The first term in a sequence is 12.
The sequence has an increase of 11.

Write down the sequence.

12, ... , ... , ... [1]

(iii) The first term in a sequence is a.
The sequence has an increase of 11.

Complete the sequence using expressions in terms of a.

a, ... , ... , ... [1]

(iv) Use the sequence in **part (c)(iii)** to show algebraically that your product difference in **part (c)(i)** is correct.

[3]

Question 3 is printed on the next page.

3 Find the sequence that has a product difference of 578 and a last term of 100.

..... , ... , ... , 100 [3]