



# Cambridge IGCSE™

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## CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/53

Paper 5 Investigation (Core)

October/November 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 [ ].

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This document has **8** pages.

## INVESTIGATION ODD SETS

In this investigation, you will look at calculations made from an odd number of connected integers.

Use these steps.

STEP 1 Write down an odd number of integers that increase by the same positive integer each time.

STEP 2 Multiply the first and last integers.

STEP 3 Square the middle integer.

Example

This is a set of 3 integers that increase by 1 each time.

$$\begin{array}{ll} \text{STEP 1} & 3, 4, 5 \\ \text{STEP 2} & 3 \times 5 = 15 \\ \text{STEP 3} & 4^2 = 16 \end{array}$$

1 (a) Complete this table.

STEP 1	STEP 2		STEP 3	
	Calculation	Answer	Calculation	Answer
1, 2, 3	$1 \times 3 =$	3	$2^2 =$	
5, 6, 7	$5 \times 7 =$			= 36
8, 9, 10	$\times =$	80	$9^2 =$	
14, 15, 16	$\times =$			= 225

[3]

(b) Write down the connection between the answer to STEP 2 and the answer to STEP 3.

The answer to STEP 2 ..... [1]

(c) In a set of 3 integers that increase by 1 each time:

- one of the integers in the calculation for STEP 2 is 23
- the answer to STEP 3 is 484.

Find the 3 integers.

....., ....., ..... [2]



2 In this question, a set of 3 integers increase by 2 each time.

(a) (i) Complete this set of 3 integers.

7, ..... , .....

[1]

(ii) Work out the answers to STEP 2 and STEP 3.

STEP 2 .....

STEP 3 .....

[2]

(b) Make up 3 more sets of 3 integers that increase by 2 each time.

Investigate the connection between the answers to STEP 2 and STEP 3.  
Write down this connection.

Connection ..... [5]



3 In this question, a set of 3 positive integers increase by 3 each time.

(a) Complete the table.

STEP 1	STEP 2	STEP 3
1, 4, 7	$1 \times 7 = 7$	$4^2 =$
3, 6, 9	$3 \times 9 = 27$	$= 36$
10, 13, 16	$\times = 160$	$13^2 =$
	$\times = 315$	$= 324$

[4]

(b) Write down the connection between the answer to STEP 2 and the answer to STEP 3.

The answer to STEP 2 ..... [1]

4 Complete this table for sets of 3 connected integers.

Use your answers to **Question 1(b)**, **Question 2(b)** and **Question 3(b)** and any patterns you notice to help you.

Increase between integers each time	Answer to STEP 3 – Answer to STEP 2
1	
2	
3	
4	
5	
$k$	

[2]



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5 For a set of 3 connected integers:

- the answer to STEP 3 – the answer to STEP 2 is 225
- the integers can be positive and negative
- the integers increase by the same positive integer,  $k$ , each time
- the answer to STEP 2 is  $-125$ .

Find 2 different sets of 3 integers for which this is true.

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....., ..... , ..... and ..... , ..... , ..... [4]

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6 The first of a set of 3 integers is 10.  
The integers increase by  $k$  each time.  
Expressions for the integers are

$$10, \quad 10+k, \quad 10+2k.$$

Complete this working to show that your expression in the last cell in **Question 4** is true.

STEP 3  $(10+k)(10+k) =$

STEP 2  $10(10+2k) =$

[4]



7 There are now 5 integers in a set.

The first integer is still 10.

The integers still increase by  $k$  each time.

(a) Write an expression for the last integer in the set.  
Give your answer in its simplest form.

10,  $10+k$ ,  $10+2k$ ,  $10+3k$ , ..... [1]

(b) Show that an expression for the answer to STEP 3 – STEP 2 is now  $4k^2$ .

[3]

(c) Show that the expression in part (b) is true for this set of 5 integers.

6, 10, 14, 18, 22

[3]

**Question 7(d) is printed on the next page.**





(d) The integer at one end of a set is 41.  
There are 5 integers in the set.  
The answer to STEP 3 – the answer to STEP 2 is 144.

Find both possible sets of 5 integers.

.....  
.....

[4]

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