



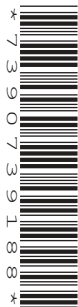
## Cambridge IGCSE™

CANDIDATE  
NAME
CENTRE  
NUMBER

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

CANDIDATE  
NUMBER

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

**CAMBRIDGE INTERNATIONAL MATHEMATICS****0607/52**

Paper 5 Investigation (Core)

**May/June 2022****1 hour 10 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 36.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **8** pages.

Answer **all** the questions.

**INVESTIGATION**

**OPPOSITE CORNERS**

This investigation is about the difference between the products of the numbers in the opposite corners of a square window on a grid.

To calculate the *opposite difference* for any window:

- multiply the numbers in the opposite corners
- subtract the smaller answer from the larger answer.

|     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2   | 4   | 6   | 8   | 10  | 12  | 14  | 16  | 18  | 20  |
| 22  | 24  | 26  | 28  | 30  | 32  | 34  | 36  | 38  | 40  |
| 42  | 44  | 46  | 48  | 50  | 52  | 54  | 56  | 58  | 60  |
| 62  | 64  | 66  | 68  | 70  | 72  | 74  | 76  | 78  | 80  |
| 82  | 84  | 86  | 88  | 90  | 92  | 94  | 96  | 98  | 100 |
| 102 | 104 | 106 | 108 | 110 | 112 | 114 | 116 | 118 | 120 |
|     |     |     |     |     |     |     |     |     |     |

Consecutive even numbers fill a grid of width 10 as shown.  
The grid continues downwards.

A 2 by 2 window moves on the grid.

Example

This is the first window.

|    |    |
|----|----|
| 2  | 4  |
| 22 | 24 |

$$22 \times 4 = 88$$

$$2 \times 24 = 48$$

$$88 - 48 = 40$$

The opposite difference is 40.

3

- 1 (a) Use the grid to complete each window and find the opposite difference.

|    |    |
|----|----|
| 14 |    |
| 34 | 36 |

$$34 \times \dots\dots\dots = \dots\dots\dots$$

$$14 \times 36 = \dots\dots\dots$$

$$\dots\dots\dots - \dots\dots\dots = \dots\dots\dots$$

Opposite difference = .....

|    |    |
|----|----|
| 66 | 68 |
| 86 |    |

.....

|     |     |
|-----|-----|
| 150 | 152 |
|     |     |

..... [4]

- (b) What do you notice about the opposite difference for each of these windows on this grid?

..... [1]

2 A 3 by 3 window moves on the same grid.

(a) Complete the corner squares in the first window.

|   |  |   |
|---|--|---|
| 2 |  | 6 |
|   |  |   |
|   |  |   |

[1]

(b) Complete the opposite difference calculations for this window.

..... × 6 = .....

2 × ..... = .....      ..... − ..... = .....

[2]

(c) Complete the corner squares for each window and find the opposite difference.

|    |  |  |
|----|--|--|
| 4  |  |  |
|    |  |  |
| 44 |  |  |

.....

|    |  |    |
|----|--|----|
| 10 |  |    |
|    |  |    |
|    |  | 54 |

.....

|     |  |  |
|-----|--|--|
|     |  |  |
|     |  |  |
| 174 |  |  |

..... [4]

5

3 A 4 by 4 window moves on the grid on page 2.

(a) Complete the corner squares in the first window.

|   |  |  |   |
|---|--|--|---|
| 2 |  |  | 8 |
|   |  |  |   |
|   |  |  |   |
|   |  |  |   |

[2]

(b) Complete the opposite difference calculations for this window.

$$\dots \times 8 = \dots$$

$$2 \times \dots = \dots \quad \dots - \dots = \dots$$

[2]

(c) Complete the corner squares for each window and find the opposite difference.

|    |  |  |  |
|----|--|--|--|
|    |  |  |  |
|    |  |  |  |
|    |  |  |  |
| 64 |  |  |  |

.....

|  |  |  |    |
|--|--|--|----|
|  |  |  | 20 |
|  |  |  |    |
|  |  |  |    |
|  |  |  |    |

..... [3]

4 (a) Copy the opposite differences that you have found and complete the table.

| Size of window |             |     | Opposite difference |
|----------------|-------------|-----|---------------------|
| 2 by 2         | $(2 - 1)^2$ | = 1 |                     |
| 3 by 3         | $(3 - 1)^2$ | = 4 |                     |
| 4 by 4         | $(4 - 1)^2$ | = 9 |                     |
| 5 by 5         |             |     |                     |
|                |             |     |                     |
| w by w         |             |     | 40( )               |

[4]

(b) Find the greatest possible opposite difference for a square window on the grid on page 2.

..... [3]

(c) Can a square window on this grid have an opposite difference of 1400?  
Show how you decide.

[2]

7

- 5 Another grid of consecutive even numbers has width 5.  
The diagram shows the start of the grid.

|    |   |   |   |    |
|----|---|---|---|----|
| 2  | 4 | 6 | 8 | 10 |
| 12 |   |   |   |    |

The diagram shows a 2 by 2 window on the grid.  
 $n$  is the first number in the window.

|     |       |
|-----|-------|
| $n$ | $n+2$ |
|     |       |

- (a) Complete the window using expressions in terms of  $n$ .

[2]

- (b) Use your expressions to show that the opposite difference for a 2 by 2 window is 20.

[3]

Question 6 is printed on the next page.

## 8

- 6 A square window moves on the grid of width 5 with squares numbered 2, 4, 6, ... .  
The opposite difference for this window is 180.

Find the size of the window.

..... [3]

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.