Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

7390739188

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.

[Turn over

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:

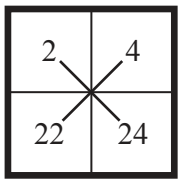
- multiply the numbers in the opposite corners
- subtract the smaller answer from the larger answer.

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.



$22 \times 4 = 88$
$2 \times 24 = 48$ $\qquad 88 - 48 = 40$

The opposite difference is 40.

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

14	
34	36

34 × ..... = ...

14 × 36 = ...

..... − ..... = ...

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]

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.

..... × 8 = ...

2 × ..... = ... − ..... = ... [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]

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.

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]