Cambridge Assessment International Education

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9997697711 65

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/53**

Paper 5 Investigation (Core) **May/June 2021**

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.

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[Turn over

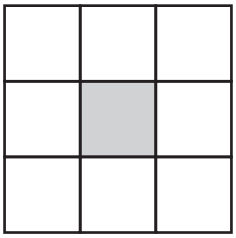
Answer **all** the questions.

INVESTIGATION PATHS AROUND SQUARES AND RECTANGLES

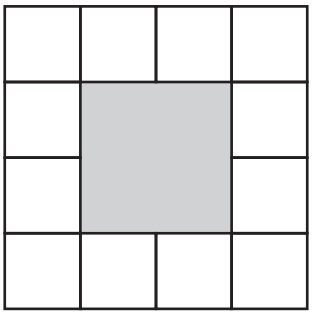
This investigation looks at paths around different squares and rectangles.

In this investigation
- all lengths are in metres
- all tiles are squares of side 1 metre.

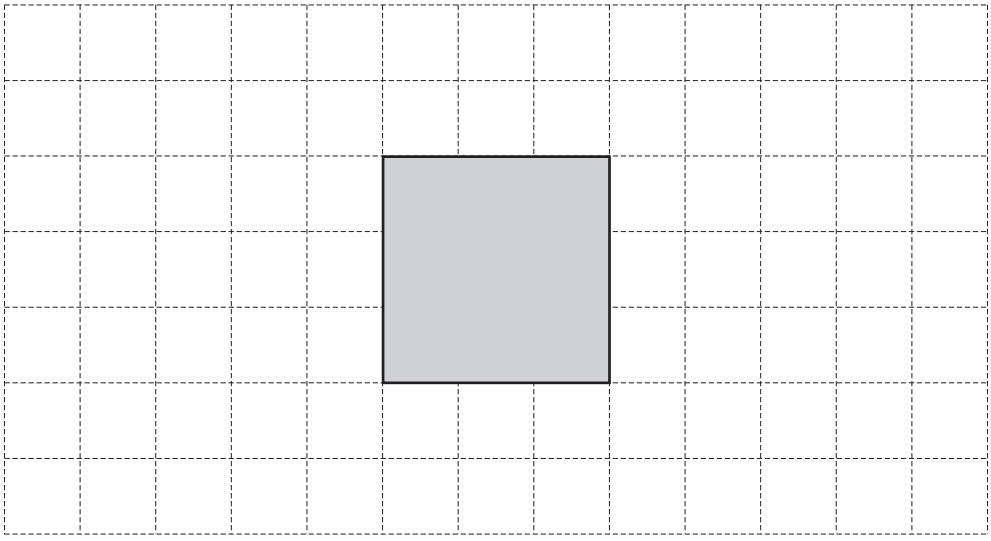
The path around a square of side 1 needs 8 square tiles.



This is the path around a square of side 2.



1 **(a)** On this grid, draw the path around the square of side 3.



[1]

(b) On this grid, draw the path around a square of side 4.



[1]

(c) This table shows the number of tiles in the paths around squares of different sizes.

Complete the table.

Side of square	Number of tiles in path
1	8
2	
3	
4	

[1]

(d) Work out the number of tiles that make the path around a square of side 6.

..... [2]

(e) Explain why the path around a square cannot have exactly 50 tiles.

..... [1]

(f) Find an expression, in terms of n, for the number of tiles in the path around a square of side n.

..... [2]

(g) Work out the number of tiles in the path around a square of side 88.

..... [2]

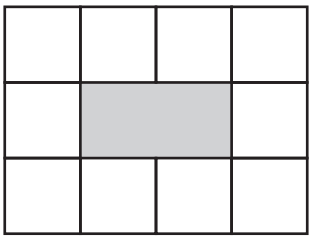
(h) The path around a square has 400 tiles.

Work out the area of the square.

..... [3]

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2 This is the path around a rectangle of width 1 and length 2.



(a) On the grid, draw a diagram to show the path around the given rectangles.

Rectangle width 1 and length 3 Rectangle width 1 and length 4

[2]

(b) Complete the table to show the number of tiles in the paths around rectangles of width 1 with different lengths.

Length of rectangle (L)	Number of tiles in path
2	
3	
4	
5	

[2]

(c) Find an expression, in terms of L, for the number of tiles in the path around a rectangle of width 1 and length L.

..... [3]

3 **(a)** **(i)** Complete the table to show the number of tiles in the paths around rectangles of width 2 with different lengths.
You may use the grid to help you.

Length of rectangle (L)	Number of tiles in path
1	
2	
3	
4	

[3]



(ii) Find an expression, in terms of L, for the number of tiles in the path around a rectangle of width 2 and length L.

..... [2]

(b) Find an expression, in terms of L, for the number of tiles in the path around a rectangle of width 3 and length L.

..... [2]

(c) Complete the table.
Use your expressions from **Questions 2(c)**, **3(a)(ii)** and **3(b)**.

Width of rectangle (W)	Number of tiles in path around a rectangle of length L
1	
2	
3	
4	

[2]

(d) Find an expression, in terms of L and W, for the number of tiles in the path around a rectangle of length L and width W.

..... [2]

(e) Use your answer to **part (d)** to write an expression for the number of tiles in the path around a rectangle of length n and width n.
Give your answer in its simplest form.

..... [2]

Question 4 is printed on the next page.

4 The path around a rectangle has 20 tiles.

Complete the table to show all the possible lengths and widths of the rectangle.
You may not need all the rows.
You may use the grid to help you.

Length of rectangle (L)	Width of rectangle (W)

[3]

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