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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 Investigation (Core) **May/June 2026**

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. Do **not** use correction fluid or tape.
- 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 **12** pages. Any blank pages are indicated.

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Investigation Frame sums

In this investigation, you will look at calculations in a frame moving on a number grid.

The frame is made of 3 squares.
The frame moves on the number grid.

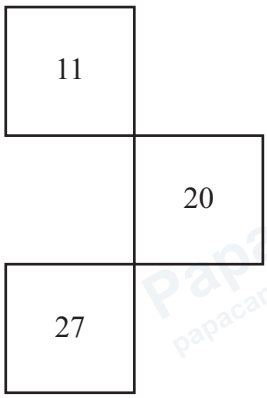
Consecutive whole numbers fill a grid of width 8.
The grid continues downwards.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40

To find the frame sum for any frame:

- square the number on the right
- multiply the two numbers on the left
- subtract the second answer from the first answer.

Example



$20^2 = 400$
$11 \times 27 = 297$
$400 - 297 = 103$

frame sum $= 103$

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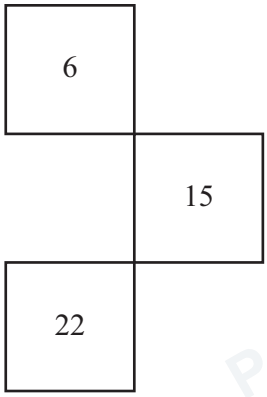
1 **(a)** Complete the calculations to find the frame sum for this frame.



15^2 = ...

6×22 = ...

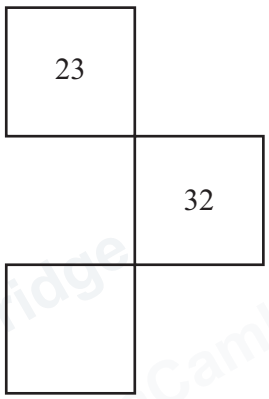
..... – ..... = ...

frame sum = ...

[3]

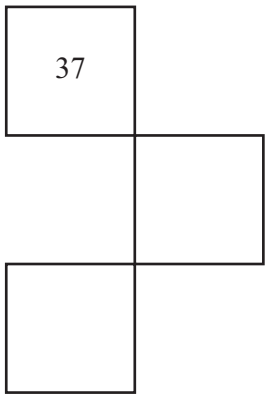
(b) Use the grid to complete each frame and find the frame sum.

(i)



..... [2]

(ii)



..... [2]

(c) When you move 1 square to the right on the grid, the number increases by 1.

Complete the statement.

When you move 1 square down on the grid, the number increases by ..... [1]

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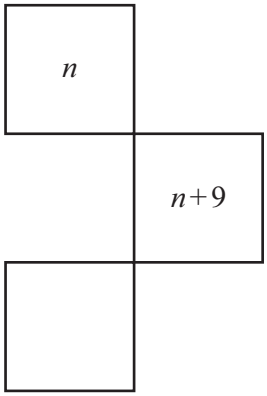
2 The diagram shows the frame on the same grid.
The number in the top square is n.



(a) Complete the bottom square with an expression in terms of n. [1]

(b) Complete the steps below to show that an expression for the frame sum is $2n+81$.

$$(n+9)^2 = (n+9)(n+9) = n^2+9n+9n+.....$$

$$n(..... + ...) = ...$$

$$n^2+9n+9n+..... - .....$$

$$\text{frame sum} = 2n+81$$

[2]

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(c) The number in the top square of the frame is 207.

Find the frame sum.

..... [2]

(d) The frame sum is 197.

Find the number in the top square of the frame.

..... [2]

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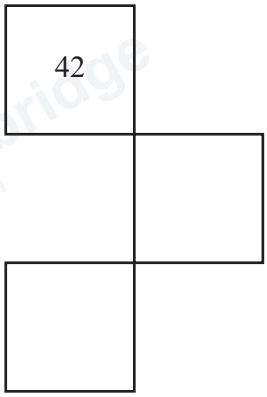
3 The frame moves on a different grid.
The grid starts at 5.
The width of the grid is 12 squares.
The grid continues downwards.

5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52
53	54	55	56	57	58	59	60	61	62	63	64

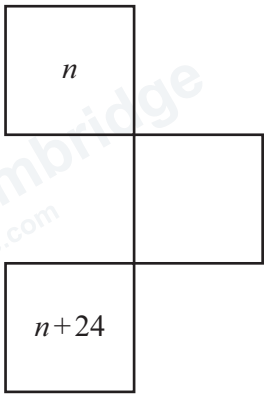
(a) Find the frame sum for the frame in this position.



..... [3]

(b) The number in the top square is n.

Complete the square on the right with an expression in terms of n.



[1]

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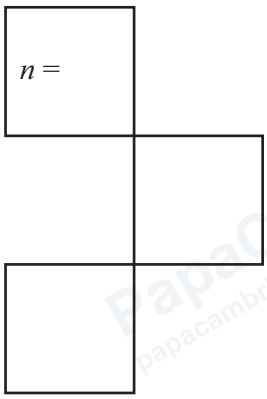
(c) Show that an expression for the frame sum is $2n + 169$.

[3]

(d) The frame sum for this frame is 205.

Use **3(c)** to find the value of n.
Complete the frame



[4]

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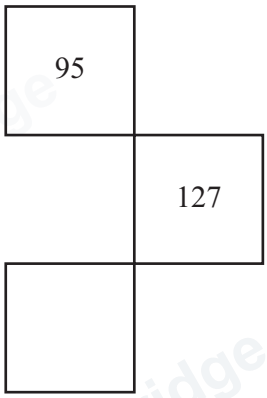
4 The numbers in the grid increase by a different amount.

In this grid:

- the numbers start at 11
- the numbers increase by 4
- the width of the grid is 7 squares
- the grid continues downwards.

11	15	19	23	27	31	35
39	43	47	51	55	59	63
67	71	75	79	83	87	91
95	99	103	107	111	115	119
123	127	131	135	139	143	147

(a) Find the frame sum for this frame.



..... [3]

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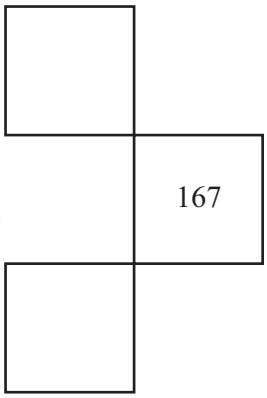
(b) Complete the frame.



[2]

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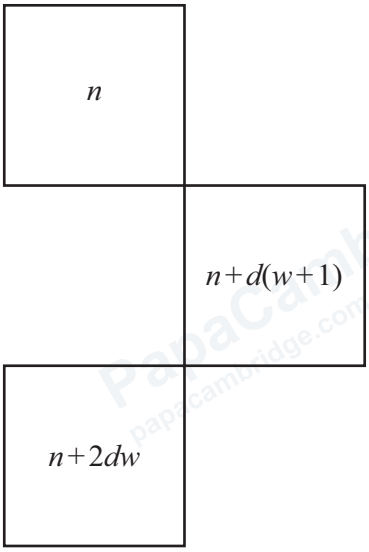
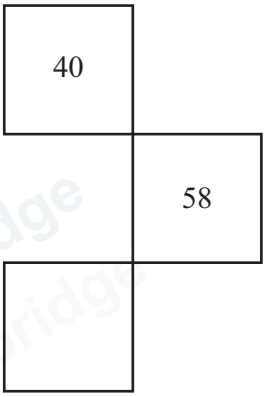
5 In another grid:

- the numbers increase by d
- the width of the grid is w squares
- the grid continues downwards.

The diagram shows expressions for the numbers in the frame on this grid.
The number in the top square is n.



The frame is placed on a grid.



(a) Show that $d(w+1) = 18$.

[1]

(b) Give a reason why d cannot be 18.

.....

.....

..... [1]

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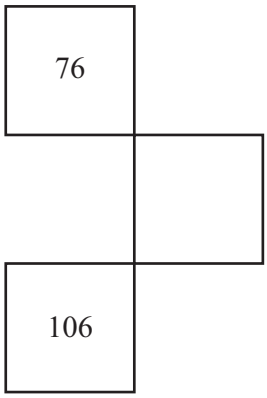
(c) Find **all** the possible pairs of values of d and w.

..... [4]

(d) The frame is moved to a different position on the **same** grid.



Find the value of d and the value of w.

$d =$ .....

$w =$ .....

[3]

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