Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8826971234

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/53**

Paper 5 (Core) **October/November 2017**

1 hour

Candidates answer on the Question Paper.

Additional Materials: Graphics Calculator

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
You must show all relevant working to gain full marks for correct methods, including sketches.
In this paper you will also be assessed on your ability to provide full reasons and to communicate your mathematics clearly and precisely.
At the end of the examination, fasten all your work securely together.
The total number of marks for this paper is 24.

This document consists of **8** printed pages.

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[Turn over

Answer **all** the questions.

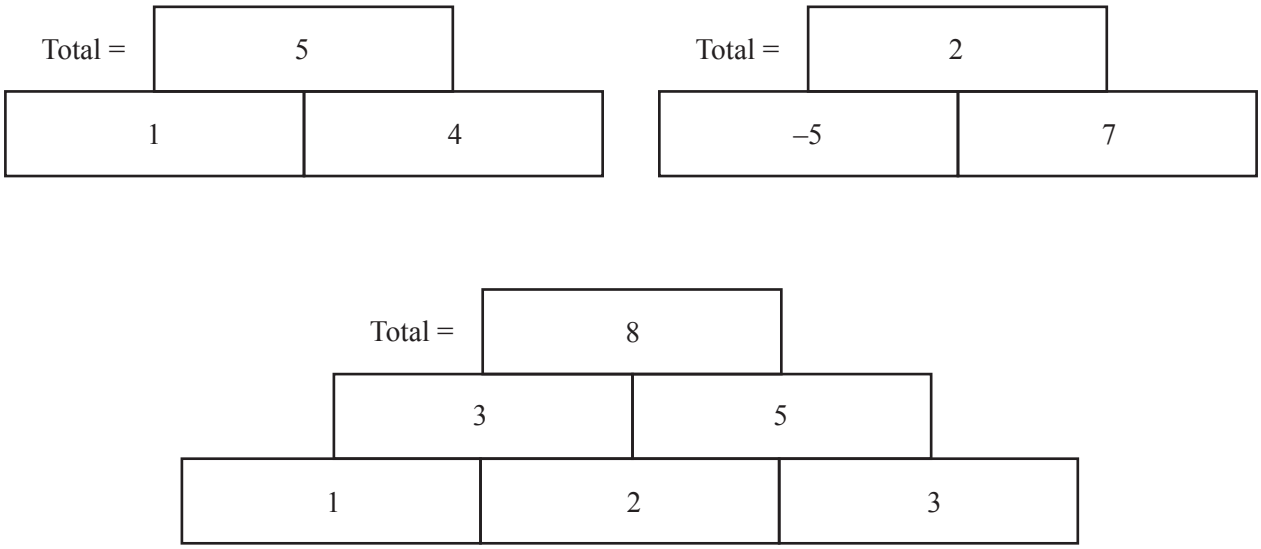
INVESTIGATION **NUMBER WALLS**

This investigation looks at what happens when you place numbers on a *Number Wall*.

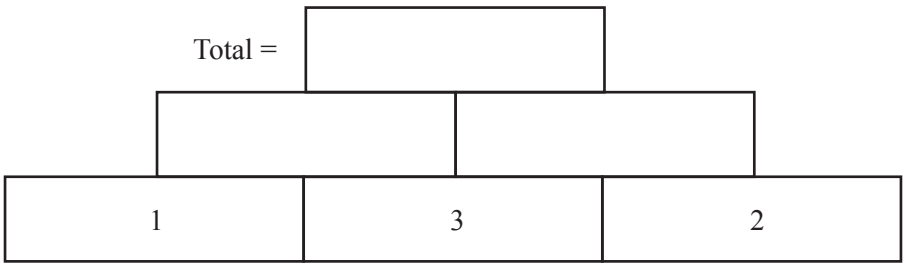
You make a *Number Wall* like this.

- Integers are put on the bottom row of bricks.
- The number on a brick is the sum of the numbers on the two bricks below.

Examples



1 **(a)** Complete this *Number Wall*.



(b) In **part (a)**, the number 3 is on the middle brick of the bottom row.
In the example, the number 3 is on the end brick of the bottom row.

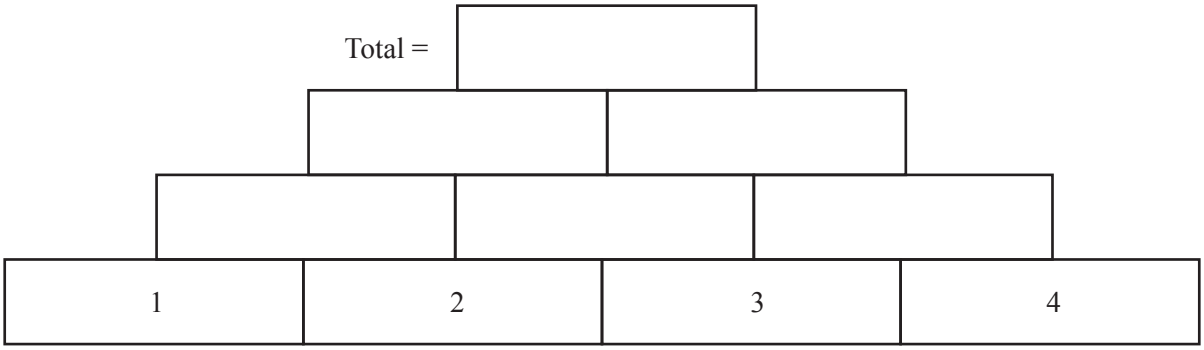
Explain why putting the number 3 on the middle brick of the bottom row increases the total.

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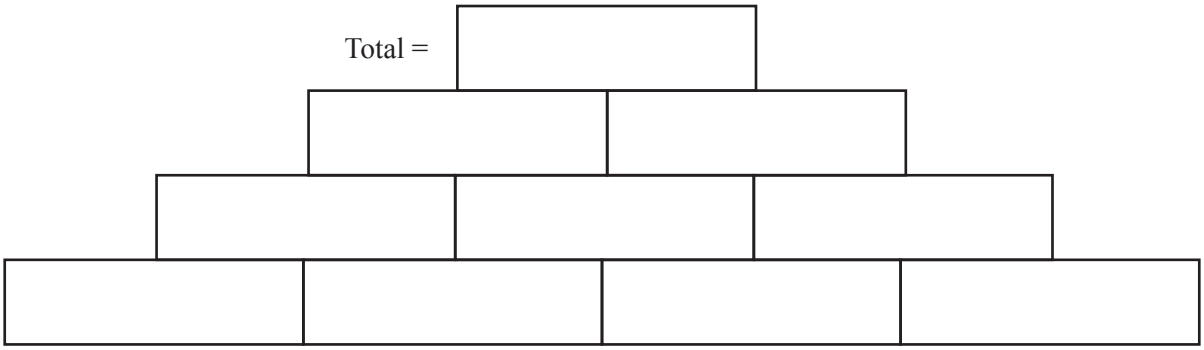
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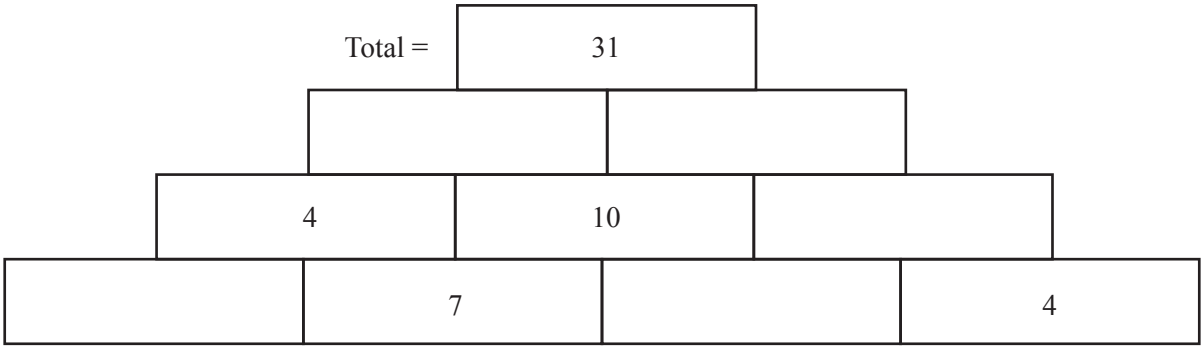
2 **(a)** Complete this *Number Wall*.



(b) Put the numbers 1, 2, 3 and 4 on the bottom row and complete this *Number Wall* so that the total is bigger than the total in **part (a)**.



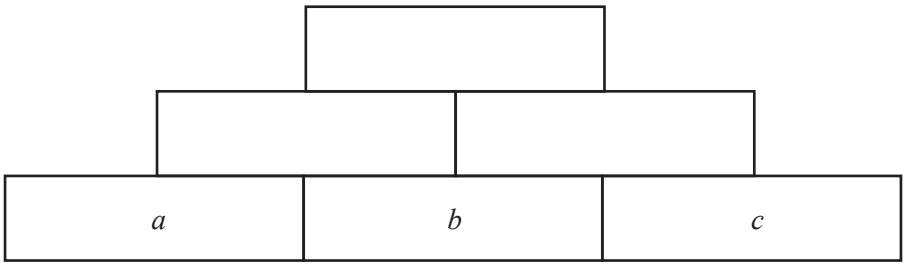
(c) Complete this *Number Wall*.
You may use negative numbers.



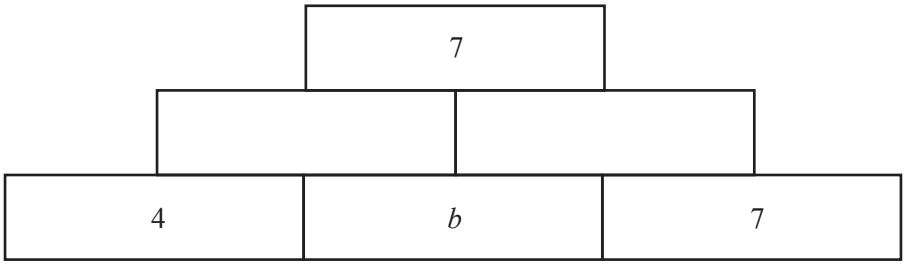
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3 This *Number Wall* is 3 bricks high.

(a) Complete each brick using expressions in terms of a, b and c.
Write each expression in its simplest form.



(b) Use the expression for the total you found in **part (a)** to find the value of b.

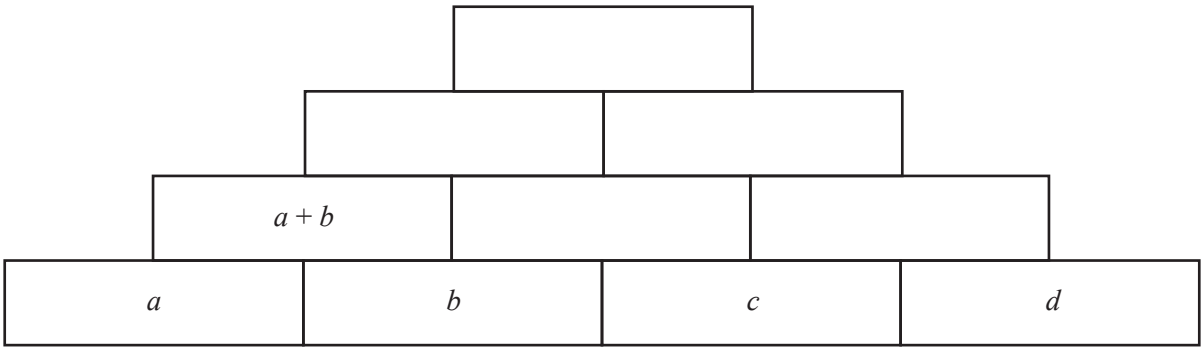


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4 **(a)** This *Number Wall* is 4 bricks high.

Complete each brick using expressions in terms of a, b, c and d.
Write each expression in its simplest form.



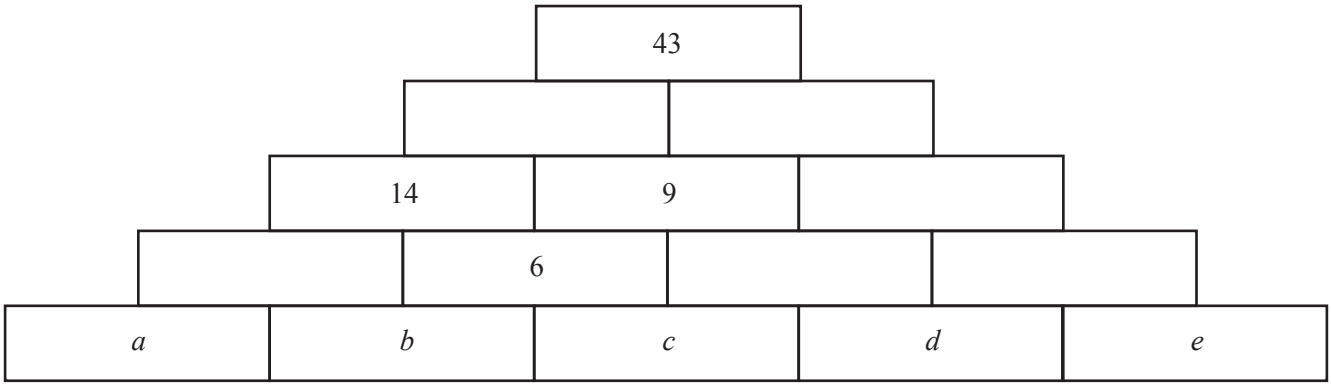
(b) In another wall that is 4 bricks high, the total is 34 and the values of a, b, c and d are all the same.

Use the expression for the total you found in **part (a)** to show that the value of a cannot be an integer.

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(c) In this *Number Wall* that is 5 bricks high, only integers greater than 0 are used.

Find one set of possible values for a, b, c, d and e.



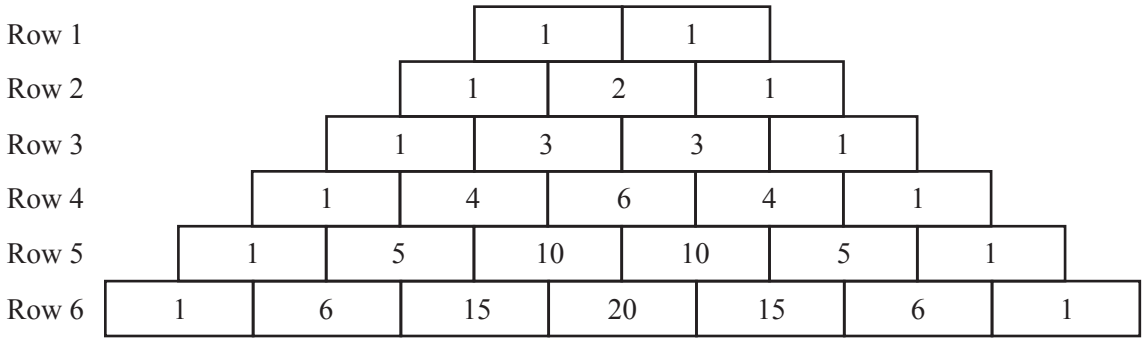
a = ... b = ... c = ... d = ... e = ...

5 In 1653 a French mathematician, Blaise Pascal, wrote about a triangle of numbers similar to the one shown below.
It is made in the same way as *Number Walls* but

- the number on a brick is the sum of the numbers on the two bricks **above**

and

- the number on the first and last brick in each row is always 1.



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(a) The wall in **question 4(a)** is 4 bricks high.

Show clearly how your expression for the total in **question 4(a)** connects to the numbers in one row of this triangle.
Write down which row this is.

Row .....

(b) A wall that is 5 bricks high has a, b, c, d and e, in that order, along the bottom row.

Write down an expression in terms of a, b, c, d and e for the total.

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(c) Use your expression from **part (b)** to check that the set of values you found for a, b, c, d and e in **question 4(c)** gives a total of 43.

Question 5(d) is printed on the next page.

(d) A wall that is 5 bricks high has the number 2017 on **each** brick of the bottom row.

Find the total.

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