Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2977744375

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 (Core) **May/June 2015**

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 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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CAMBRIDGE International Examinations

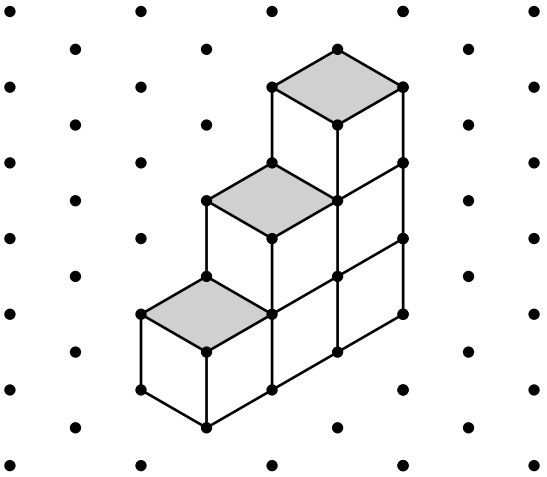
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Answer **all** the questions.

INVESTIGATION **STAIRCASES**

This investigation looks at the number of cubes that make different types of staircase.

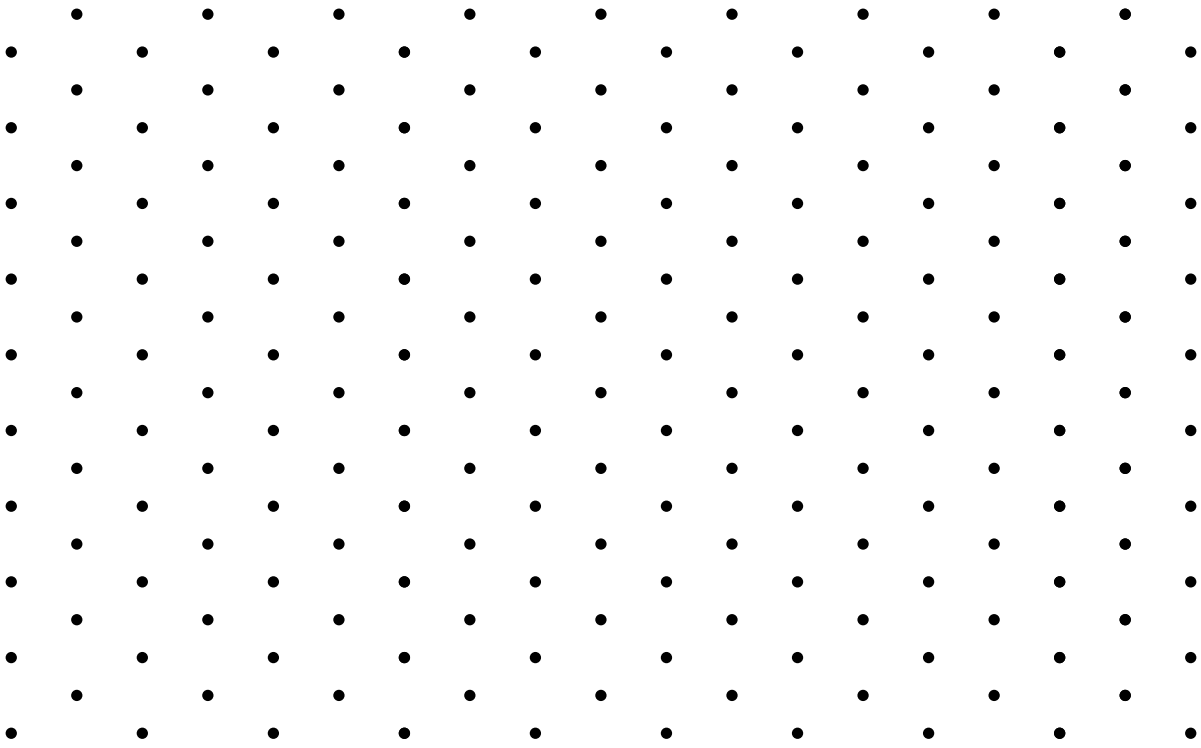
1 This is an *UP staircase* of height 3 made using 6 cubes.
It is a 3-step *UP staircase* because it has a height of 3 cubes.



(a) Write down the number of cubes that make an *UP staircase* of height 2.

.....

(b) On the grid below draw an *UP staircase* of height 4.



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(c) Complete the table for the number of cubes that make these *UP staircases*.

Height	1	2	3	4	5	6
Number of cubes	1		6			

(d) Find how many cubes make an *UP staircase* of height 10.

.....

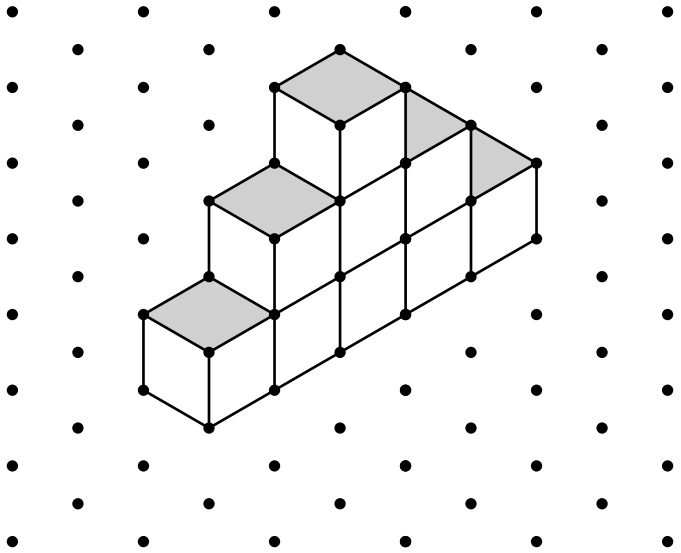
(e) **(i)** What is the height of the tallest *UP staircase* that can be made from 100 cubes?

.....

(ii) Find how many cubes would be left over.

.....

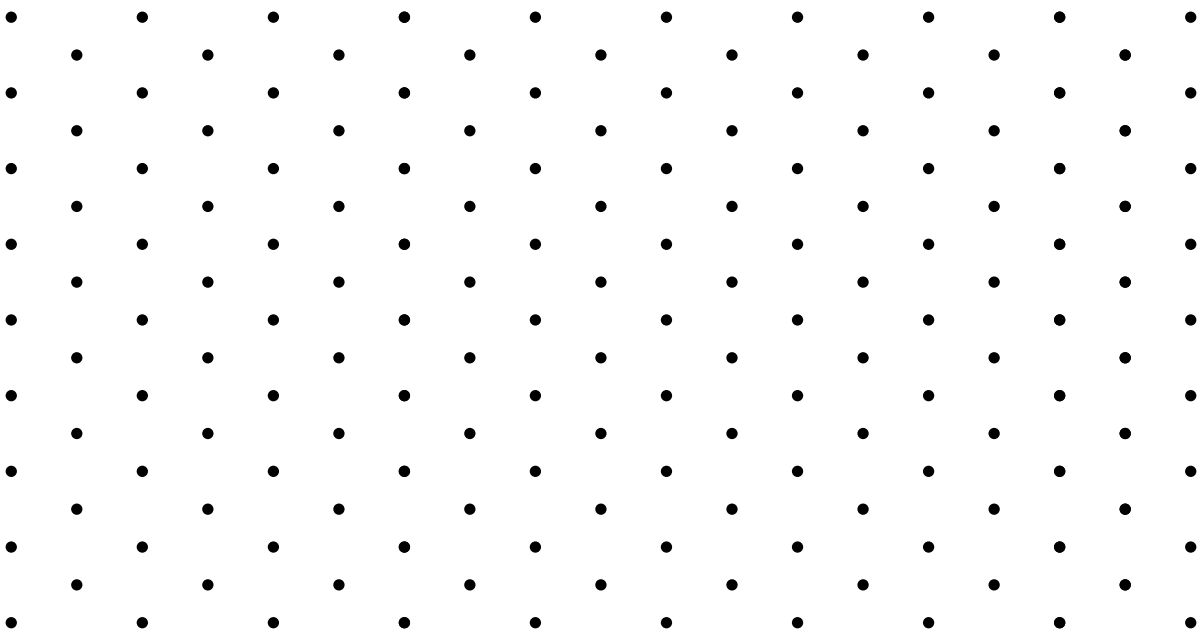
2 This is an *UP AND DOWN staircase* of height 3 made using 9 cubes.
It is a 3-step *UP AND DOWN staircase* because it has a height of 3 cubes.



(a) Find how many cubes make an *UP AND DOWN staircase* of height 4.

.....

(b) On the grid below draw an *UP AND DOWN staircase* of height 2.



(c) Complete the table for the number of cubes that make these *UP AND DOWN staircases*.

Height	1	2	3	4	5	6
Number of cubes	1		9			

(d) The numbers of cubes form a sequence.
Write down the mathematical name of this sequence.

.....

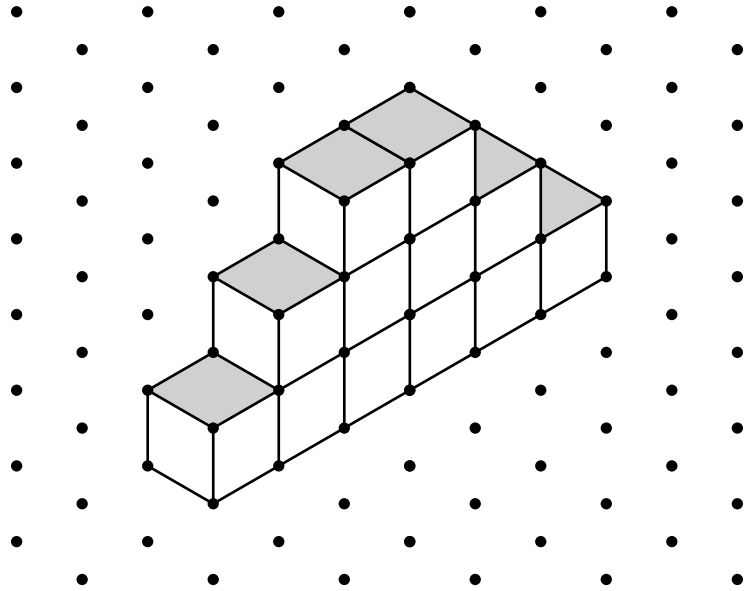
(e) Find how many cubes make an *UP AND DOWN staircase* of height 10.

.....

(f) Find an expression, in terms of n, for the number of cubes that make an *UP AND DOWN staircase* of height n.

.....

3 This is a *DOUBLE staircase* of height 3 made using 12 cubes.
It is a 3-step *DOUBLE staircase* because it has a height of 3 cubes.



(a) Find how many cubes make a *DOUBLE staircase* of height 2.

.....

(b) Complete the table for the number of cubes that make these *DOUBLE staircases*.

Height	1	2	3	4	5	6
Number of cubes	2		12			

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(c) Find how many cubes make a *DOUBLE staircase* of height 10.

.....

(d) **(i)** Find an expression, in terms of n, for the number of cubes that make a *DOUBLE staircase* of height n.

.....

(ii) Find the height of a *DOUBLE staircase* made from 240 cubes.

.....

(e) Write down the connection between the number of cubes that make a *DOUBLE staircase* and the number of cubes that make an *UP AND DOWN staircase*, when both staircases have the same height.

.....

.....

Question 4 is printed on the next page.

4 **(a)** Write down the connection between the number of cubes that make a *DOUBLE staircase* and the number of cubes that make an *UP staircase*, when both staircases have the same height.

.....

.....

(b) Find an expression, in terms of n, for the number of cubes that make an *UP staircase* of height n.

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