Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9594950325

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/51**

Paper 5 (Core) **May/June 2018**

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 **7** printed pages and **1** blank page.

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Answer **all** the questions.

INVESTIGATION **LARGEST PRODUCTS**

This investigation looks at finding the largest product when two or more positive integers have a given sum.

For the positive integers 2 and 5

- the sum $2 + 5$ is 7
- the product 2×5 is 10.

1 **(a)** Complete this table for all the **different** pairs of positive integers that have a sum of 8.

Integers		Sum	Product
1		8	
2		8	
3		8	
4	4	8	16

Write down the calculation that gives the largest product.

.....

(b) Complete this table for all the **different** pairs of positive integers that have a sum of 10.
Note that 3 and 7 is the same pair as 7 and 3.

Integers		Sum	Product
		10	
		10	
3	7	10	21
		10	
		10	

Write down the calculation that gives the largest product.

.....

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(c) Find the largest product of two positive integers that have a sum of 6.

.....

(d) Use your answers to **part (a)**, **part (b)** and **part (c)** to help you complete the table.

Sum	6	8	10	12	14
Largest product					49

(e) **(i)** The sum of two positive integers is S.
S is an even number.

Find an expression, in terms of S, for the largest product of the two integers.

.....

(ii) The sum of two positive integers is 62.

Find the largest product of the two integers.

.....

(f) The sum of two positive integers is S.
S is an even number.
The largest product of the two integers is 576.

Find the value of S.

.....

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2 **(a)** Complete this table for all the **different** pairs of positive integers that have a sum of 9.
Note that 2 and 7 is the same pair as 7 and 2.

Integers		Sum	Product
		9	
		9	
		9	
		9	

Write down the calculation that gives the largest product.

.....

(b) Find the largest product of two positive integers that have a sum of 7.

.....

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(c) Use your answers to **part (a)** and **part (b)** to help you complete the table.

Sum	7	9	11	13	101
Largest product			30		

(d) The sum of two positive integers is S.
S is an odd number.

(i) Explain why the largest product of the two integers is always even.

.....

.....

(ii) Find an expression, in terms of S, for the largest product of the two integers.
Do not simplify your answer.

.....

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3 **(a)** **Three** positive integers have a sum of 6.

Complete the table for all the different sets of positive integers that have a sum of 6.
Writing the positive integers in a different order does not give a different set.

Integers			Sum	Product
			6	
			6	
			6	

Write down the calculation that gives the largest product.

.....

(b) Look at how you found the largest product in **part (a)** and in **question 1(a)**.

Four positive integers have a sum of 40.

Show that the largest product of these four integers is 10 000.

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(c) Complete the table.

Sum	6	40	15	24
Number of positive integers in the sum	3	4	5	6
Largest product		10 000		

(d) n integers have a sum of 40, where n is a factor of 40.

Find the value of the largest product of the n integers.

.....

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