Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/52**

Paper 5 (Core) **May/June 2016**

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 **6** printed pages and **2** blank pages.

CAMBRIDGE International Examinations

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Answer **all** the questions.

INVESTIGATION SUMS OF CONSECUTIVE INTEGERS

This investigation looks at the results when the terms of a sequence of consecutive positive integers are added together.

1 Here are four sequences of consecutive positive integers.

The sequence	5, 6, 7, 8, 9, 10, 11	has	7 terms.	The median (the middle term) is 8.
The sequence	7, 8	has only	2 terms.	The median is 7.5 .
The sequence	20, 21, 22, 23, 24, 25	has	6 terms.	The median is 22.5 .
The sequence	20, 21, 22, ..., 40	has	21 terms.	The median is 30.

For a sequence of consecutive integers,

(a) give an example to show that the number of terms is calculated using the rule

last term – first term + 1

(b) describe how to calculate the median using only the first term and the last term.

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2 **(a)** Complete the table of sequences of consecutive positive integers.

Sequence	Number of terms	Median	Sum of all the terms
3, 4, 5, 6, 7, 8, 9	7	6	
7, 8	2	7.5	
20, 21, 22, ... , 40	21	30	630
5, 6, 7			18
2, 3, 4, 5, 6, 7, 8, 9	8		
	6	4.5	27
	5	7	

(b) Explain how to calculate the sum of all the terms using only the number of terms and the median.

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(c) What is always true about the number of terms when the median is an integer?

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(d) What is always true about the median when the number of terms is even?

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3 Use your answer to **question 2(b)** to help you complete the table of sequences of two or more consecutive positive integers.

Sequence	Number of terms	Median	Sum
		5	15
	4		34
			49

4 Use your answers to **question 1** and **question 2(b)** to help you find the sum of this sequence.

15, 16, 17, ..., 985.

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5 Sequences have 2 or more terms.

Find all the sequences of consecutive positive integers that have a sum of 77.

6 **(a)** Use the factors of 16 to show why the sum of a sequence of consecutive positive integers cannot equal 16.

(b) Find a number larger than 20 that cannot be written as the sum of consecutive positive integers.

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