Cambridge Assessment International Education

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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/05**

Paper 5 Investigation (Core) **For examination from 2020**

SPECIMEN PAPER **1 hour 10 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 or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- 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 36.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **6** pages. Blank pages are indicated.

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

[1]

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

.....

..... [2]

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	

[9]

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

..... [1]

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

..... [1]

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

..... [1]

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

[7]

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

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

..... [5]

5 Sequences have 2 or more terms.

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

[4]

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

[3]

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

..... [2]