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 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 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.

DC (ST) 133977/1

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Answer **all** the questions.

INVESTIGATION **NUMBER STEMS**

This investigation is about finding numbers that have the same *Number Stem*.

The possible *Number Stems* are the nine integers from 1 to 9.

Here is how to calculate the *Number Stem* of a number.

Step 1 Add the digits of the number to get a total.
Step 2 If the total is 9 or less, STOP.
Otherwise, add the digits of the total.
Step 3 Repeat Step 2.

Examples

Number	124	Number	893
Step 1	1 + 2 + 4 = 7	Step 1	8 + 9 + 3 = 20
Step 2	STOP	Step 2	2 + 0 = 2
Number Stem is 7.		Step 3	STOP
		Number Stem is 2.	

1 **(a)** Complete the tables to show the *Number Stems* for these multiples of 3, 12, 21 and 30.

Multiple of 3	3	6	9	12	15	18	21	24	27	30
Number Stem	3	6	9	3		9	3	6	9	3

Multiple of 12	12	24	36	48	60	72	84	96	108	120
Number Stem	3	6	9			9			9	3

Multiple of 21	21	42	63	84	105	126	147	168	189	210
Number Stem	3					9	3	6	9	3

Multiple of 30	30	60	90	120	150	180	210	240	270	300
Number Stem	3					9	3	6	9	3

(b) Complete this statement.

The numbers in the table that have a *Number Stem* of 9 are all ..... of 9.

(c) Complete this table.

3	÷	9	=	0	remainder	3
12	÷	9	=	1	remainder	3
21	÷	.....	=	2	remainder	3
.....	÷	9	=	3	remainder	3
39	÷	9	=	.....	remainder	.....

(d) Complete the statement.

A number that has a ..... of 3 when divided by 9 has a *Number Stem* of ..... .

[Turn over

(e) The only one-digit number with a *Number Stem* of 3 is 3.
This sequence shows the first four numbers **greater than 3** with a *Number Stem* of 3.

12, 21, 30, 39, ...

(i) Write down the rule for continuing this sequence.

.....

(ii) Find the *n*th term of this sequence.

.....

(iii) Find the 87th number **greater than 3** that has a *Number Stem* of 3.

.....

2 **(a)** Complete the tables to show the *Number Stems* for different multiples of 2 and 11.

Multiple of 2	2	4	6	8	10	12	14	16	18	20	22	24
Number Stem	2	4	6	8						2	4	6

Multiple of 11	11	22	33	44	55	66	77	88	99			
Number Stem	2	4	6	8						2	4	6

(b) The sequence shows the first three numbers **greater than 2** with a *Number Stem* of 2.

11, 20, 29, ...

(i) Write down the next two numbers of the sequence.

..... , ...

(ii) Find the *n*th term of this sequence.

.....

(iii) Show that 1352 is the 150th number **greater than 2** that has a *Number Stem* of 2.

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3 **(a)** Write down the first four numbers **greater than 8** with a *Number Stem* of 8.

..... , ... , ... , ...

(b) Find the nth term of this sequence.

.....

(c) Using your answer to **part (b)**, find the number closest to 10 000 that has a *Number Stem* of 8.

.....

4 The integer k is a *Number Stem*.

(a) Write down, in terms of k, expressions for the first four numbers **greater than** $\boldsymbol{k}$ with a *Number Stem* of k.

..... , ... , ... , ...

(b) Write down, in terms of n and k, the nth term for the sequence of numbers **greater than** $\boldsymbol{k}$ with a *Number Stem* of k.

.....

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