Cambridge Assessment International Education

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T9600228865

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/53**

Paper 5 Investigation (Core) **May/June 2024**

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 may use tracing paper.
- 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 **8** pages.

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Answer **all** the questions.

INVESTIGATION CHANGING THE ORDER OF OPERATIONS

This investigation is about the results of two calculations when you change the order of operations.

Each calculation uses three integers, x, y and z.

Calculation 1	Calculation 2
Add y and z. Multiply the answer by x.	Multiply y and z. Add the answer to x.

Example

$x = 3, \quad y = 5, \quad z = 7.$

Calculation 1	Calculation 2
$y + z = 5 + 7 \ = 12$	$y \times z = 5 \times 7 \ = 35$
$12 \times x = 12 \times 3 = 36$	$35 + x = 35 + 3 = 38$
Result = 36	Result = 38

1 In this question $x = 2, \quad y = 4, \quad z = 6.$

Complete calculation 1 and calculation 2.

Calculation 1	Calculation 2
$y + z = 4 + 6 =$	$y \times z = 4 \times 6 =$ .....
..... $\times x =$ ..... $\times 2 =$	..... $+ x =$ ..... $+ 2 =$ .....
Result = ...	Result = ... [4]

2 **(a)** Work out the results of calculation 1 and calculation 2 when $x = 3$, $y = 4$, $z = 9$.

Result of calculation 1: .....

Result of calculation 2: ..... [2]

(b) What do you notice about your results in **part (a)**?

..... [1]

3 In this question x and z do not change in each part.

(a) In this part $x = 2$ and $z = 4$.

Complete the table.

			Calculation 1		Calculation 2	
x	y	z	$y+z$	$\times x$ = result	$y \times z$	$+ x$ = result
2	1	4	5		4	
2	2	4		12		10
2	3	4				

[3]

(b) In this part $x = 3$ and $z = 6$.
y increases by 1 each time.

Continue the table until the two results are the same.
You may not need all the rows.

x	y	z	$y+z$	$\times x$ = result	$y \times z$	$+x$ = result
3	1	6	7	21	6	9
3	2	6	8	24	12	15
3	3	6				

[3]

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(c) In this part $x = 4$ and $z = 8$.

Find the value of y that makes the results of calculation 1 and calculation 2 the same.
Use this table to help you.

			Calculation 1		Calculation 2	
x	y	z	$y+z$	$\times x$ = result	$y \times z$	$+x$ = result

$y =$ ..... [3]

4 The results of calculation 1 and calculation 2 are the same.

(a) Complete the table.
Use your answers to **Question 3** and any patterns you notice to help you.

x	y	z
2		4
3		6
4		8
5		
6		
	17	

[3]

(b) Find expressions in terms of x for y and for z.

$y =$ .....

$z =$ ..... [2]

5 In this question $x = 1$ and $y = 1$.

(a) Write down expressions for calculation 1 and for calculation 2 in terms of z.
Show that these results are the same.

[2]

(b) What do your results in **part (a)** tell you about the value of z?

..... [1]

6 In this question x, y and z are consecutive. For example 15, 16 and 17.

(a) Complete the table.

x	y	z
15	16	17
12		
		20

[1]

(b) Write y and z in terms of x.

$y =$ .....

$z =$ ..... [1]

(c) Show that the result of calculation 1 is $2x^2 + 3x$.

[2]

(d) Find the result of calculation 2 in terms of x.
Give your answer in its simplest form.

..... [3]

(e) The results of calculation 1 and calculation 2 are the same.

Show that $x^2 = x + 2$.

[1]

Question 6(f) is printed on the next page.

(f) The results of calculation 1 and calculation 2 are the same.
x, y and z are consecutive.
x, y and z are all between -5 and 5.

Find two sets of values for x, y and z.

..... [4]

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