

Answer **all** the questions.

For
Examiner's
Use

INVESTIGATION

SUMS OF SEQUENCES

Here is the method to construct a sequence for this investigation.

Method	Example
Write down any two numbers for the first two terms.	3 and 7
Add these two terms to make the third term.	$3 + 7 = 10$
Add the second and third terms to make the fourth term.	$7 + 10 = 17$
Add the third and fourth terms to make the fifth term.	$10 + 17 = 27$
Continue in this way to construct the sequence.	

This example makes the sequence: 3, 7, 10, 17, 27, 44,

1 Show that the sum of the first six terms in this sequence, divided by the fifth term, is 4.

2 (a) The first two terms of a new sequence are 272 and 412.

(i) Use the method to write down the next four terms in this sequence.

272, 412, , , ,

(ii) Work out the sum of the first six terms in this sequence and divide it by the fifth term.

.....

(b) The first two terms of another sequence are 4.52 and 16.9 .

(i) Use the method to write down the next four terms in this sequence.
Do not round any of your numbers.

4.52, 16.9, , , ,

(ii) Work out the sum of the first six terms in this sequence and divide it by the fifth term.

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(c) (i) Choose two negative numbers to be the first two terms of a sequence.

Use the method to work out the next four terms in this sequence.
Write down the first six terms in your sequence.

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(ii) Work out the sum of the first six terms in your sequence and divide it by the fifth term.

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(d) Describe the connection between the fifth term and the sum of the first six terms in each of these sequences.

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- 3 The first two terms of a new sequence are p and q .
The table shows the working for the first five terms.

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Working	Term
p	p
q	q
$p + q$	$p + q$
$q + p + q$	$p + 2q$
$p + q + p + 2q$	$2p + 3q$

- (a) Complete the table.
- (b) Find an expression for the sum of these first six terms.
Simplify your answer.

.....

- (c) Find an equation to connect the fifth term and the sum of the first six terms.

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4 (a) 3, 7, 10, 17, 27, 44,

(i) Write down the next four terms in this sequence.

3, 7, 10, 17, 27, 44,,,,

(ii) Work out the sum of the first ten terms in this sequence and divide it by the seventh term.

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(b) (i) Find the next four terms in the sequence in **question 3**.

7th term

8th term

9th term

10th term

(ii) Find an expression for the sum of the first ten terms in this sequence.
Simplify your answer.

.....

(iii) Find an equation to connect the seventh term and the sum of the first ten terms.

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5 (a) Find the next four terms in the sequence in **question 4(b)**.

11th term

12th term

13th term

14th term

(b) Find an expression for the sum of the first fourteen terms.
Simplify your answer.

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(c) This sum is a multiple of one of the terms in **question 4(b)(i)**.
Find this multiple.

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(d) Describe this connection using algebra.

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