

## Topic 16 Sequences and functions (Post-TT) [35]

1.

The  $n$ th term of a sequence is given by the expression  $n^2 - 3$   
Write down the first three terms of the sequence.

(Total 2 marks)

2.

A sequence of numbers is shown.

2      5      8      11      14

(a) Find an expression for the  $n$ th term of the sequence.

(2)

(b) Explain why 99 will not be a term in this sequence.

(2)

(Total 4 marks)

3.

Which sequence is a geometric progression?

Circle your answer.

[1 mark]

1 2 3 4

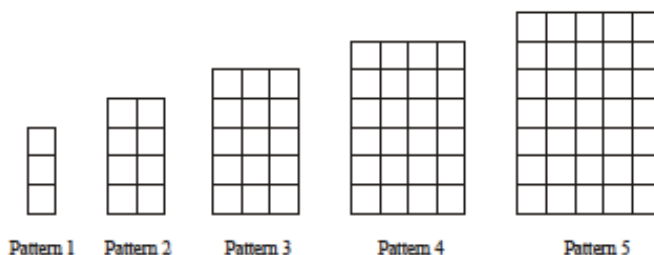
1 2 4 7

1 2 4 8

1 2 3 5

4.

A sequence of rectangular patterns is shown.



(a) Calculate the number of small squares in Pattern 20.

(2)

(b) Explain why the number of small squares in Pattern  $n$  is  $n(n + 2)$ .

(2)

(Total 4 marks)

5.

(a) Here are the first five terms of two sequences.

Write down the next term in each of these sequences.

(i) 1 1 2 3 5

(ii) 5 8 13 20 29

(b) The  $n$ th term of a sequence is given by  $n^2 - 3n$ .

Write down the second and fifth terms of the sequence.

(Total 4 marks)

6. (a) Work out the formula for the  $n$ -th term of the sequence: 15, 19, 25, 33, ... (4)  
(b) Which term in the sequence is the number 825? (3)

(Total 7 marks)

7.

Here are the first four terms of an arithmetic sequence.

6 10 14 18

(a) Write an expression, in terms of  $n$ , for the  $n$ th term of this sequence.

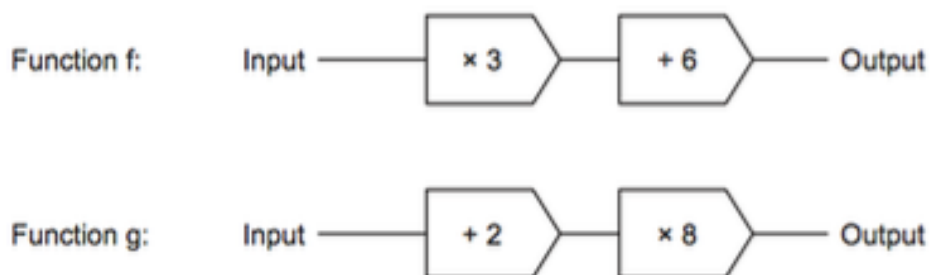
The  $n$ th term of a different arithmetic sequence is  $3n + 5$

(b) Is 108 a term of this sequence?  
Show how you get your answer.

(Total 4 marks)

8.

Two functions,  $f$  and  $g$ , are represented by these function machines.



(a)  $x$  is put into function  $f$ .  
The output from function  $f$  is then put into function  $g$ .

Find a simplified expression for the output from function  $g$ .

(b) A number is chosen.  
This number is put into both function  $f$  and function  $g$ .  
The output from both functions is the same.

Work out the number that was chosen.

(Total 5 marks)

9. Work out the formula for the  $n$ -th term of the sequence: 2, 10, 22, 38, ...

(Total 4 marks)