

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

1.

-2, 1, 6

B2

-1 each error or emission.

Ignore extra terms

$1^2 - 3, 2^2 - 3, 3^2 - 3$ is B1

[2]

2.

(a) $3n - 1$

B2

oe

B1 for any of the following:

$3n (+c)$

$n = \times 3 - 1$

$n\text{th} = \times 3 - 1$

$n\text{th} \times 3 - 1$

$n^3 - 1$

(b) Complete explanation

B2

eg 2, 5, 8... not multiples of 3

eg 98 and 101 are in the sequence

eg $3n - 1 = 99$ does not give a whole number

eg $n = 33.3...$

eg 100 is not a multiple of 3

eg 99 is a multiple of 3

Part explanation B1

eg 101 is in the sequence

eg 98 is the nearest

SC1 for correctly using their answer from (a) provided linear but not $n + 3$

[4]

3.

| | |
|---------------|----|
| 1 2 4 8 | B1 |
|---------------|----|

4.

(a) 20×22

M1

440

A1

(b) n squares across or $n + 2$ squares high

B1

n wide or n along

$n + 2$ up or length $n + 2$

$n(n + 2)$ for area

B1

Multiply them for area/total number of squares

[4]

5.

| | | | |
|-----|------|-----------------|-------------------------------|
| (a) | (i) | 8 | 1 1 AO1.3a |
| | (ii) | 40 | 1 1 AO1.3a |
| (b) | | $\frac{-2}{10}$ | 1 1 1 AO1.2 1 AO1.3a |

6.

(a)

Second differences = 2 so coefficient of n^2 is 1 [B1]

Attempt to find the rest of the formula: [M1]

E.g. $1 + b + c = 15$ gives $b + c = 14$

$4 + 2b + c = 19$ gives $2b + c = 15$

Either $b = 1$ or $c = 13$ [A1]

Formula is $n^2 + n + 13$ [A1]

(b) $n^2 + n + 13 = 825$

Rearrange to put equal to zero: $n^2 + n - 812 = 0$ [M1]

Attempt to solve the quadratic or trial and error (at least 2 values) [M1]

28th term in the sequence [A1]

7.

| | | | |
|-----|--|----------------|--|
| (a) | | $4n+2$ | M start to deduce nth term from information given eg $4n+k$ where $k \neq 2$ A1 cao |
| (b) | | No (supported) | M1 starts method that could lead to a deduction eg uses inverse operations C1 for a convincing argument eg 34 is 107 so NO; $(108-5)+3$ is not an integer |

8.

| | | | | | |
|-----|--|---------------------------|---------------------------|--|---|
| (a) | | $24x + 64$ or $8(3x + 8)$ | 2 2 AO1.3a | M1 for $3x + 6$ seen | |
| (b) | | -2 | 3 1 AO1.3a 2 AO3.1a | M1 for $3'x' + 6 = 8('x' + 2)$ oe M1 for $5'x' = -10$ | Form equation Begin to solve for 'x' |

9.

Second differences = 4 so coefficient of n^2 is 2 [B1]

Attempt to find the rest of the formula: [M1]

E.g. $2 + b + c = 2$ gives $b + c = 0$

$8 + 2b + c = 10$ gives $2b + c = 2$

Either $b = 2$ or $c = -2$ [A1]

Formula is $2n^2 + 2n - 2$ [A1]