Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- the common difference is 5, so the nth term starts $5n$; at $n = 1$, $5 \times 1 = 5$ and the term is 7

$$= \mathbf{5n + 2}$$

2.2

- each term is $\times 3$

$$\mathbf{324} \text{ and } \mathbf{972}$$

2.3

- each term is $\times 4$ and the first term is 3

$$= \mathbf{3 \times 4^{n-1}}$$

2.4

- the nth term is $5n + 2$; set $5n + 2 = 100$, so $n = 19.6$
- n is not a whole number, so **no**

2.5

- $7 + 11 = 18$ and $11 + 18 = 29$: **18**, **29**

3.1

(a)

- first differences 7, 11, 15, 19 rise by 4, so the next is 23

$$54 + 23 = \mathbf{77}$$

(b)

- the second difference is 4, so the n^2 coefficient is $4 \div 2 = 2$
- subtract $2n^2$, i.e. 2, 8, 18, 32, 50, from the terms: 0, 1, 2, 3, 4
- that remainder is $n - 1$

$$= \mathbf{2n^2 + n - 1}$$

3.2

- the terms are 1^3, 2^3, 3^3, 4^3

$$= \mathbf{n^3}$$

3.3

- differences 3, 5, 7, 9; second difference 2, so start from n^2: $1, 4, 9, 16, 25$
- the sequence is 4 more each time: $\boldsymbol{n^2 + 4}$

3.4

- from the 3rd to the 5th term multiplies by r^2: $r^2 = 162 \div 18 = 9$, so $r = 3$
- first term $= 18 \div 3^2 = 2$
- nth term $= \mathbf{2 \times 3^{n-1}}$

3.5

(a)

- differences 7, 11, 15, 19; second difference 4, so $2n^2 + bn + c$
- $n = 1$: $2 + b + c = 4$; $n = 2$: $8 + 2b + c = 11$, so $b = 1$, $c = 1$
- $\boldsymbol{2n^2 + n + 1}$

(b)

- $2n^2 + n + 1 = 211$, so $2n^2 + n - 210 = 0$, $(2n + 21)(n - 10) = 0$
- the **10th** term