Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- Add 4 each time: **21, 25**.

2.2

- $u_n = 6 + 5(n-1) = \mathbf{5n + 1}$.

2.3

- Subtract squares $1, 4, 9, 16$: the difference is 2, so $u_n = n^2 + 2$.

2.4

- $u_5 = 5^3 - 1 = 125 - 1 = \mathbf{124}$.

3.1

(a)

- $u_n = 7 + 4(n-1) = \mathbf{4n + 3}$.

(b)

- $u_{30} = 4(30) + 3 = \mathbf{123}$.

(c)

- $4n + 3 = 100$ gives $n = 97/4 = 24.25$. **No**, a pattern number must be a positive integer.

3.2

(a)

- These are one more than successive squares.
- The next terms are **26 and 37**, and $u_n = \mathbf{n^2 + 1}$.

(b)

- For 50, $n^2 = 49$ gives $n = 7$, so **50 is a term**.
- For 60, $n^2 = 59$ lies strictly between 7^2 and 8^2; there is no integer index, so **60 is not a term**.

3.3

- Substitute $n = 1, 2, 3$: $5 \times 1 - 3$, $5 \times 2 - 3$, $5 \times 3 - 3$.
- **2**, **7**, **12**.

3.4

(a)

- The terms go down by 4, so the nth term contains $-4n$; when $n = 1$, $-4 + 34 = 30$.
- $\mathbf{34 - 4n}$.

(b)

- Need $34 - 4n < 0$, so $4n > 34$ and $n > 8.5$.
- The **9th** term, which is $34 - 36 = -2$.

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