Solutions

2.1

- $4 \times 2 - 1 = 7$, then $7 \times 2 - 1 = 13$, then $13 \times 2 - 1 = 25$
- $\mathbf{7}, \mathbf{13}, \mathbf{25}$

2.2

- $n = 1, 2, 3$: $5 - 3 = 2$, $10 - 3 = 7$, $15 - 3 = 12$, so $\mathbf{2}, \mathbf{7}, \mathbf{12}$
- $n = 10$: $5 \times 10 - 3 = \mathbf{47}$

2.3

- difference 4, so $4n$; zero term $7 - 4 = 3$
- $\boldsymbol{4n + 3}$

2.4

- difference -3, so $-3n$; zero term $20 + 3 = 23$
- $\boldsymbol{23 - 3n}$

2.5

- $4n + 1 = 81$ gives $4n = 80$
- $n = 20$, a whole number, so **yes**: 81 is the 20th term

3.1

- $n + 6$ gives $7, 8, 9, \ldots$; the difference is 6, so the nth term must start $6n$
- zero term $3 - 6 = -3$: $\boldsymbol{6n - 3}$

3.2

(a)

- difference 3, so $3n$; zero term $4 - 3 = 1$
- $\boldsymbol{3n + 1}$ sticks

(b)

- $3n + 1 \leq 150$ gives $3n \leq 149$, so $n \leq 49.6\ldots$
- the largest pattern is **pattern 49**, using 148 sticks

3.3

- $6n - 4 > 100$ gives $6n > 104$, so $n > 17.3\ldots$, so $n = 18$
- $6 \times 18 - 4 = \mathbf{104}$

3.4

- set them equal: $3n + 10 = 5n - 2$
- $12 = 2n$, so $n = 6$
- both give $3 \times 6 + 10 = 28$: the **6th** term, value **28**

3.5

- from the 3rd to the 7th term is 4 differences: $4d = 37 - 17 = 20$, so $d = 5$
- 3rd term $= 3 \times 5 + c = 17$, so $c = 2$
- $\boldsymbol{5n + 2}$