1 Write down the nth term of each sequence.

(a) $11, 16, 21, 26, \ldots$ (1)

(b) $-1, 2, 5, 8, \ldots$ (1)

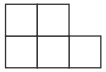
(c) $0, 7, 14, 21, \ldots$ (1)

(d) $-5, -1, 3, 7, \ldots$ (1)

(4 marks)

2 **Pattern 1 is built for you.** To make the next pattern, **one cube is added to the end of the row**. The square of four cubes is in every pattern.

Build it with cubes, then check against the picture.



Pattern 1

(a) How many cubes in pattern 5? (1)

(b) Write down the nth term (1)

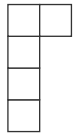
(c) Explain your rule by describing the pattern: which cubes change and which do not (2)

(d) How many cubes in pattern 40? (1)

(5 marks)

3 **Pattern 1 is built for you.** To make the next pattern, **a new column of 3 cubes is added on the right**. The two cubes on top are in every pattern.

Build it with cubes, then check against the picture.



Pattern 1

(a) How many cubes in pattern 4? (1)

(b) Write down the nth term (1)

(c) Explain, from the pattern, where the 3 and the 2 come from (2)

(d) Pattern number k has 35 cubes. Find k. (2)

(6 marks)

4 The nth term of a sequence is $50 - 3n$.

(a) Write down the first four terms (1)

(b) Is this sequence increasing or decreasing? (1)

(c) Find the 15th term (1)

(d) Explain how you can tell from the rule alone that the sequence is decreasing (2)

(5 marks)

5 Here are the first two terms of a sequence: $4, 8, \ldots$

(a) If the rule is $4n$, write down the next two terms (1)

(b) Write down a different sequence that also begins $4, 8$ (2)

(c) Explain why two terms are not enough to be sure of a rule (2)

(5 marks)

6 **Extension.** Ruth says the nth term of $2, 4, 6, 8$ is *double the position number*. Ricardo says it is *add the position number to itself*.

(a) Write down Ruth's rule using n (1)

(b) Write down Ricardo's rule using n (1)

(c) Are both of them right? Use algebra to explain. (2)

(4 marks)