1 Find the nth term of each sequence. These involve fractions.

(a) $\frac{1}{2}, 1, \frac{3}{2}, 2, \ldots$ (1)

(b) $\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}, \ldots$ (1)

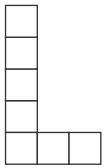
(c) $-\frac{1}{2}, 0, \frac{1}{2}, 1, \ldots$ (1)

(d) $1\frac{1}{2}, 2, 2\frac{1}{2}, 3, \ldots$ (1)

(4 marks)

2 **Pattern 1 is built for you.** To make the next pattern, **a new column of 4 cubes is added on the right**. The three cubes underneath are in every pattern.

Build it with cubes, then check against the picture.



Pattern 1

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

(b) Find the nth term (1)

(c) Explain where the 4 and the 3 come from in the pattern (2)

(d) A pattern has 43 cubes. Which pattern number is it? (2)

(6 marks)

3 A sequence has nth term $3n + 5$.

(a) Is 50 a term in this sequence? Show your working. (2)

(b) Is 60 a term in this sequence? Show your working. (2)

(4 marks)

4 Find the nth term of each sequence.

(a) $100, 95, 90, 85, \ldots$ (1)

(b) $-8, -3, 2, 7, \ldots$ (1)

(c) $2\frac{1}{2}, 4, 5\frac{1}{2}, 7, \ldots$ (1)

(3 marks)

5 Look at the sequence $2, 6, 12, 20, 30, \ldots$

(a) Write down the differences between consecutive terms (1)

(b) Explain why the method of differences does not give an nth term rule for this sequence (2)

(c) Write down the next two terms anyway, using the pattern in the differences (1)

(4 marks)

6 **Extension.** Two sequences both begin with 5. The first has nth term $3n + 2$ and the second has nth term $6n - 1$.

(a) Write down the first four terms of each (2)

(b) Find a term that appears in both sequences, other than 5 (2)

(c) Explain why the second sequence grows faster (2)

(6 marks)