

1 Algebraic notation: multiplying

Simplify

a) $2m \times (-3mn) \times 4n^2$

b) $(3x^2y)^3$

a) $-24m^2n^3$

b) $3x^2y \times 3x^2y \times 3x^2y = 27x^6y^3$

2 Term to term rules

a) The first term is 5. The rule is subtract 3, then multiply by 2. Find the 4th term.

b) The rule is multiply by 3, then add k . The first two terms are 4 and 17. Find k and the 3rd term.

a) 5, 4, 2, -2: 4th term -2

b) $12 + k = 17$, $k = 5$: $17 \times 3 + 5 = 56$

3 Square and triangular numbers

The n th triangular number is $\frac{n(n+1)}{2}$.

a) Is 120 a triangular number? Show how you know.

b) Two triangular numbers next to each other add to 81. Find them.

a) $n(n+1) = 240 = 15 \times 16$: yes, the 15th

b) $36 + 45 = 81$

4 Fibonacci type sequences

Each term is the sum of the two terms before it.

a) The 1st term is 3 and the 4th term is 19. Find the 2nd and 3rd terms.

b) The 3rd term is 10 and the 5th term is 27. Find the first two terms.

a) 3, 6, 3 + 6, $3 + 26 = 19$: 3, 8, 11, 19

b) $x + y = 10$, $2x + 3y = 27$

$y = 7$, $x = 3$: 3, 7, 10, 17, 27

Sequences revision mat answers

5 The n th term of a linear sequence

2.5, 4, 5.5, 7, ...

a) Find the n th term.

b) Explain why 80 is not a term in this sequence.

a) $1.5n + 1$

b) $1.5n = 79$, $n = 52.6...$, not whole

6 The n th term: using it

a) Sequence A is $3n + 20$, sequence B is $8n - 15$.

Find the first term number where B is greater than A.

b) How many terms of $5n - 3$ are between 100 and 150?

a) $8n - 15 > 3n + 20$, $n > 7$: $n = 8$

b) 21st (102) to 30th (147): 10 terms

7 The n th term of a quadratic sequence

2, 7, 14, 23, 34, ...

a) Find the n th term.

b) Is 100 a term? Show how you know.

a) n^2 , then 1, 3, 5, 7, 9: $n^2 + 2n - 1$

b) 9th term 98, 10th term 119: no

8 Types of sequences

P 1, 8, 27, 64 Q 3, 4, 7, 11 R 80, 40, 20, 10

a) What type of sequence is each one?

b) A geometric sequence has 1st term 4 and 3rd term 36. Find both possible 2nd terms.

a) P cube numbers, Q Fibonacci type, R geometric

b) ratio 3 or -3: 12 or -12