

Check out

You should now be able to ...

✓ Find the term-to-term rule for a sequence.	5
✓ Find the position-to-term rule for a sequence, and write it as the $n$ th term.	6
✓ Use sequences to solve problems in practical situations.	6
✓ Generate sequences using a recursive formula.	7

Test it

Questions

5	1
6	2 - 5
6	6
7	7



Language

Meaning

Example

<b>Sequence</b>	A set of numbers that follow a rule.	4, 7, 10, 13, ... is a sequence.										
<b>Term</b>	A number in a sequence.	10 is the third term of the sequence 4, 7, 10, 13, ...										
<b>Position</b>	The place that a term has in a sequence.	10 is in the third position in the sequence 4, 7, 10, 13, ...										
<b>Term-to-term rule</b>	A rule that explains how to get from one term to the next term.	In the sequence 4, 7, 10, 13, ... the rule is 'add 3 each time'.										
<b>Position-to-term rule</b>	A rule that uses the position to work out the term.	In this sequence <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>Position</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Term</td> <td>4</td> <td>7</td> <td>10</td> <td>13</td> </tr> </table> the position to term rule is 'Multiply the position by 3 and then add 1'.	Position	1	2	3	4	Term	4	7	10	13
Position	1	2	3	4								
Term	4	7	10	13								
<b><math>n</math>th term</b>	A shorter way to write the position-to-term rule that uses the letter $n$ .	The position-to-term rule 'multiply the position by 3 and then add 1' can be written $3n + 1$ .										

1 Write the term-to-term rule and the next two terms in each case.

- a 1, 2, 4, 8, ...
- b 80, 40, 20, 10, ...
- c 2, 5, 11, 23, ...

2 This sequence is made using short sticks.



- a Write the term-to-term rule in words.
- b How many sticks are needed to make position 4?

c Copy and complete the table.

Position	1	2	3	4	5
Term	4	7			

d Use the table to find the position-to-term rule.

e How many sticks are needed to make the 20th position?

3 Find the position-to-term rule for each of these sequences.

- a 5, 9, 13, 17, ...
- b 18, 25, 32, 39, ...
- c 3.5, 4, 4.5, 5, ...
- d 9, 8, 7, 6, ...

4 Generate the first 5 terms of the sequences with these position-to-term rules.

- a  $T(n) = 6n - 2$
- b  $T(n) = \frac{1}{2}n - 1$
- c  $T(n) = 2(n + 3)$
- d  $T(n) = 12 - 2n$

5 Find the  $n$ th term for each of these sequences.

- a 3, 5, 7, 9, ...
- b 8, 18, 28, 38, ...
- c -5, 0, 5, 10, ...
- d 10, 7, 4, 1, ...

6 The volume of diesel (in litres) left in a fuel tank at the end of each day is given by  $T(n) = 78 - 5n$ .

- a Write a sequence for the volume of diesel in the tank at the end of each day for a week.
- b How many litres of diesel will be left in the tank after two weeks?
- c Day one was a Monday. On which day of the third week will it run out of diesel completely?

7 Describe each sequence using a recursive formula.

- a 5, 8, 11, 14, 17, ...
- b 16, 11, 6, 1, -4, ...
- c 3, 6, 12, 24, 48, ...
- d 324, 108, 36, 12, 4, ...

What next?

<b>Score</b>	0 - 3	Your knowledge of this topic is still developing. To improve look at Formative test: 3B-13; MyMaths: 1165, 1173 and 1945
	4, 5	You are gaining a secure knowledge of this topic. To improve look at Invisipen: 281, 282, 283, 285, 286 and 293
	6, 7	You have mastered this topic. Well done, you are ready to progress!