GCSE Maths – Algebra

Generating a Sequence

Worksheet

NOTES

SOLUTIONS

This worksheet will show you how to work out different types of sequence generation questions. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

Section A

Worked Example

Calculate the term-to-term rule of the sequence $6, 11, 16, 21, 26$ ... and write the next three terms of the sequence.

Step 1: Calculate the difference between each term in the sequence.

The difference between 6 and 11 is $+5$. Checking the next terms, we see that the difference between the second and third term is also $+5$. The same can be checked for the other terms in the sequence.

This means that our term-to-term rule is '$+\ 5$'.

Step 2: Use the term-to-term rule to work out the next terms in the sequence.

The last term we were given is 26. We can work out the next terms by adding 5 to the terms as follows:

Term 6: $26 + 5 = \mathbf{31}$
Term 7: $31 + 5 = \mathbf{36}$
Term 8: $36 + 5 = \mathbf{41}$

Guided Example

Calculate the term-to-term rule of the sequence $1, 3, 5, 7, 9$ ... and write the next five terms of the sequence.

Step 1: Calculate the difference between each term in the sequence.

Step 2: Use the term-to-term rule to work out the next terms in the sequence.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

1. Calculate the term-to-term rule and write the next three terms for the following sequences:

a) 6, 16, 26, 36, 46…

b) -12, -8, -4, 0….

c) 1.25, 1.5, 1.75, 2, 2.25…

Section B

Worked Example

Work out the position-to-term rule of the sequence $3, 6, 9, 12, 15$ ...and calculate the term for position 10.

Step 1: Write out the terms next to their positions and work out the relationship between the position and the term.

Position 1: 3 $(1 \times 3 = 3)$
Position 2: 6 $(2 \times 3 = 6)$
Position 3: 9 $(3 \times 3 = 9)$
Position 4: 12 $(4 \times 3 = 12)$
Position 5: 15 $(5 \times 3 = 15)$

Each position number is multiplied by 3 to get the term. Therefore, the position-to-term rule is 'multiply by 3', or '$\times 3$'.

Step 2: Use the position-to-term rule to calculate the term for the position required.

We are asked to find the term for position 10.
Using the position-to-term rule, we can calculate that the term for position 10:

$$10 \times 3 = 30$$

So, the term in position 10 has value $\mathbf{30}$.

Guided Example

Work out the position-to-term rule for the sequence $7, 8, 9, 10, 11$ ... and calculate the term for position 14.

Step 1: Write out the terms next to their positions and work out the relationship between the position and the term.

Step 2: Use the position-to-term rule to calculate the term for the position required.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

2. Calculate the position-to-term rule for the following sequences and work out the term for the position given.

a) 7, 14, 21, 28, 35… and position 7

b) -8, -7, -6, -5, -4… and position 12

c) 1, 4, 9, 16, 25… and position 21