

Lesson 2

Number Sequences : Year 9

Non-Calculator

2.1 The Sequence Code

Here is how a mathematician might describe a typical number sequence;

$$A_n = 8n - 5$$

The first thing to notice, is that the description is in ALGEBRA.

This ALGEBRA is called "the formula for the n^{th} term".

We're more used to seeing number sequences written out as numbers.

So, what sequence of numbers does this formula for the n^{th} term describe ?

A table is useful....

Position, n	1 st	2 nd	3 rd	4 th	5 th	6 th
Term, $A_n = 8n - 5$						

2.2 Exercise

Question 1

Write out the first six terms for each of the sequences described in the following table;

	Position, n					
	1 st	2 nd	3 rd	4 th	5 th	6 th
$A_n = 5n - 2$						
$B_n = 4n + 5$						
$C_n = 15n - 10$						
$D_n = 2n - 7$						
$E_n = 100n - 1$						
$F_n = 20 - n$						
$G_n = 10n + 8$						
$H_n = -3n$						
$I_n = 11 - 2n$						
$J_n = 6n + 17$						
$K_n = 9n - 20$						
	Terms					

Question 2

Start with 0.25, and keep adding 0.15.

- (a) Write down the first ten terms in the sequence.
Give all of your answers to two decimal places.

_____, _____, _____, _____, _____,
_____, _____, _____, _____, _____, ...

- (b) Will the number 20.34 eventually be in this sequence ?
Give a reason for your answer.

Question 3

Start with 0.6, and keep multiplying by 2.

- (a) Write down the first ten terms in the sequence.

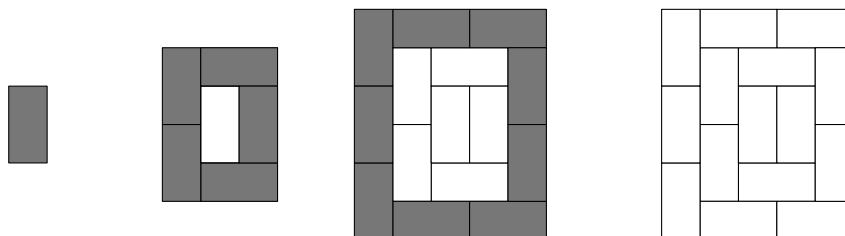
_____, _____, _____, _____, _____,
_____, _____, _____, _____, _____, ...

- (b) Will the number 1000 eventually be in this sequence ?
Give a reason for your answer.

Question 4

This sequence is formed by, starting with one brick, adding a ring of bricks around the previous shape.

The first three patterns are shown, and the fourth is about to be drawn.



1 brick 5 bricks 9 bricks ??? bricks

- (a) Draw the fourth diagram, by adding a ring of bricks.
(b) How many bricks were needed to make the ring in the fourth diagram ?

Question 5

A sequence is described by the following algebra;

$$W_n = 4n - 0.5$$

(a) Write down the first six terms;

Position, n	1 st	2 nd	3 rd	4 th	5 th	6 th
Term, $W_n = 4n - 0.5$						

(b) Solve the following equation;

$$4n - 0.5 = 99.5$$

(c) Is 99.5 in the sequence ?

Use part (b) to explain your answer.

Question 6

A sequence is described by the following algebra;

$$Z_n = 6n + 1.6$$

(a) Write down the first six terms;

Position, n	1 st	2 nd	3 rd	4 th	5 th	6 th
Term, $Z_n = 6n + 1.6$						

(b) Solve the following equation;

$$6n + 1.6 = 121.6$$

(c) Is 121.6 in the sequence ?

Use part (b) to explain your answer.

Question 7

Sequence A starts with 7, and each term is 4 more than the previous term.

- (a) Write down the first ten terms in sequence A .

____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____

- (b) Write down the algebra that will describe the n^{th} term of sequence A .

Question 8

Sequence B starts with 15, and each term is 6 more than the previous term.

- (a) Write down the first ten terms in sequence A .

____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____

- (b) Write down the algebra that will describe the n^{th} term of sequence B .

Question 9

Sequence C starts with -2, and each term is 9 more than the previous term.

- (a) Write down the first ten terms in sequence C .

____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____

- (b) Write down the algebra that will describe the n^{th} term of sequence C .

Question 10

Sequence D starts with -11, and each term is 3 more than the previous term.

- (a) Write down the first ten terms in sequence D .

____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____ , ____

- (b) Write down the algebra that will describe the n^{th} term of sequence D .

Question 11

Sequence E starts with -7 , and each term is 8 more than the previous term.

(a) Write down the first ten terms in the sequence.

____, _____, _____, _____, _____, _____, _____, _____, _____, _____

(b) Write down the algebra that will describe the n^{th} term of sequence E .

Question 12

Sequence F starts with 17, and each term is 3 less than the previous term.

(a) Write down the first ten terms in sequence F .

____, _____, _____, _____, _____, _____, _____, _____, _____, _____

(b) Write down the algebra that will describe the n^{th} term of sequence F .

Question 13

Sequence G starts with 28, and each term is 13 less than the previous term.

(a) Write down the first ten terms in sequence G .

____, _____, _____, _____, _____, _____, _____, _____, _____, _____

(b) Write down the algebra that will describe the n^{th} term of sequence G .