21. Friday 26th June: Sequences

8X1 – Summer Term 2

Today's lesson is about sequences.

- Section A: Term to term rule
- Section B: Position to term rule
- Section C: *n*th term
- Homework: 1 task on mathswatch

Answers are at the end of the document.

Section A – Term to term rule

Describing rules in sequences:
https://corbettmaths.com/2013/11/13/describingrules/

EG 1: Given the rule, write the sequence.

Write the first five terms of the sequence
Start at 3, add 4

$$3 \quad 7 \quad 11 \quad 15 \quad 19$$

EG 2: Given the sequence, find the missing values:
To watch me explain this, click here.

Below are linear sequences.
Fill in the gaps

$$5 \quad \_\_\_ \quad \_\_\_ \quad 23$$

$$13 \quad \_\_\_ \quad \_\_\_ \quad \_\_\_ \quad 1$$

$23 - 5 = 18$. 18 is the difference between term 1 and term 4.
There are 3 "jumps" to make between term 1 and term 4: term 1 to term 2; term 2 to term 3 and term 3 to term 4.

$$18 \div 3 = 6$$

The jump between each term is + 6.

Questions

Question 1

For each sequence, describe the rule and find the next two terms

a) 5, 7, 9, 11, ___, ___

b) 11, 16, 21, 26, ___, ___

c) 22, 19, 16, 13, ___, ___

d) -1, 2, 5, 8, ___, ___

e) 6, 2, -2, -6, ___, ___

f) -42, -35, -28, -21, ___, ___

Question 2

13, ... , 19, ... , 25

6, ... , 14, ... , 22

13, ... , ... , ... , 25

52, ... , ... , ... , 40

9, ... , ... , ... , ... , 29

-5, ... , ... , ... , ... , 10

Question 3

..... , ... , 6, ... , ... , 27

..... , 30, ... , ... , 12, ... ,

..... , -11, ... , ... , -2, ... ,

SECTION B – Position to term rule

Video: https://www.loom.com/share/277645ad7c0d4f009407fdf0922659db

EG 3: Using the *n*th term, write out the sequence.

Find the first 5 terms and then 10th term

Rule : $\boldsymbol{4n+2}$

Substitute n = 1, n = 2, n = 3, n = 4, n = 5 and then n = 10 into the expression for the rule

$Term\ 1 - 4 \times 1 + 2 = \mathbf{6}$
$Term\ 2 - 4 \times 2 + 2 = \mathbf{10}$
$Term\ 3 - 4 \times 3 + 2 = \mathbf{14}$
$Term\ 4 - 4 \times 4 + 2 = \mathbf{18}$
$Term\ 5 - 4 \times 5 + 2 = \mathbf{22}$

$Term\ 10 - 4 \times 10 + 2 = \mathbf{42}$

Questions

For each sequence, find the first 5 terms and the 10th term.

a) $3n - 1$

b) $n + 2$

c) $5n + 2$

d) $4n - 7$

e) $10n + 9$

Find the first 4 terms of the following sequences:

f) 3^n

g) $n^3 - n^2$

h) $n^2 - 4n + 1$

SECTION C – Finding the *n*th term

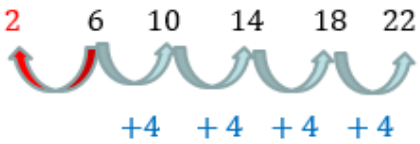
Video Clip : https://corbettmaths.com/2012/08/20/the-nth-term-for-linear-sequences/

EG 4: Finding the *n*th term

Work out the nth term for the following sequence

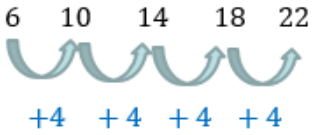
$$6 \quad 10 \quad 14 \quad 18 \quad 22$$

Method 1



$nth\ term\ is\ \ 4n+2$

Method 2

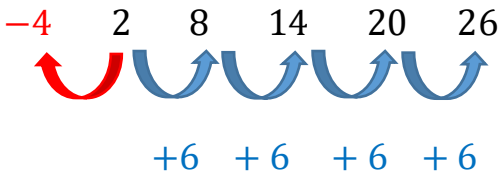


Sequence	6	10	14	18	22
$4n$	4	8	12	16	20
Difference	2	2	2	2	2

$nth\ term\ is\ \ 4n+2$

EG 5: Finding the *nth* term: I'll explain it here.

Work out the nth term for the following sequence: $2 \quad 8 \quad 14 \quad 20 \quad 26$



nth term is $\mathbf{6n-4}$

Questions

Question 1: Find the n^{th} term for each of the following sequences

(a)	5, 8, 11, 14, ...	(b)	9, 14, 19, 24, ...	(c)	1, 3, 5, 7, ...
(d)	10, 14, 18, 22, ...	(e)	2, 7, 12, 17, ...	(f)	3, 9, 15, 21, ...
(g)	11, 31, 51, 71, ...	(h)	20, 23, 26, 29, ...	(i)	1, 7, 13, 19, ...
(j)	100, 125, 150, 175, ...	(k)	13, 22, 31, 40, ...	(l)	1.5, 2, 2.5, 3, ...

Now complete the mathswatch ☺

Answers – Section A

Question 1

a) Add 2, starting at 5: 13, 15
b) Add 5, starting at 11: 31, 36
c) Subtract 3, starting at 22: 10, 7
d) Add 3, starting at -1: 11, 14
e) Subtract 4, starting at 6: -10, 014
f) Add 7, starting at -42: -14, -7

Question 2

a) 16, 22
b) 10, 18
c) 16, 19, 22
d) 49, 46, 43
e) 13, 17, 21, 25
f) -2, 1, 4, 7

Question 3

a) -8, -1, 13, 20
b) 38, 24, 18, 6
c) -14, -8, -5, 1

Section B

a) 2, 5, 8, 11, 14… 29
b) 3, 4, 5, 6, 7… 12
c) 7, 12, 17, 22, 27… 52
d) -3, 1, 5, 9, 13… 33
e) 19, 29, 39, 49, 59… 109
f) 3, 9, 27, 81
g) 0, 4, 18, 48
h) -2, -3, -2, 1

Section C

(a) 3n+2	(b) 5n+4	(c) 2n-1	(d) 4n+6
(e) 5n-3	(f) 6n-3	(g) 20n-9	(h) 3n+17
(i) 6n-5	(j) 25n+75	(k) 9n+4	(l) 0.5n+1