Find the rule for the nth term of a linear sequence

H

1 Complete the sentence.

A sequence is linear if you add or subtract the same amount each time.

2 Tick the linear sequences.

- 1, 3, 5, 7, 9 ✓
- 1, 2, 4, 8, 16
- 20, 17, 14, 11, 8 ✓
- 0.8, 1, 1.2, 1.4, 1.6 ✓
- 1, 3, 6, 10, 15
- 10, –20, 30, –40
- 60, 30, 15, 7.5

3 Match the sequence to the nth term.

$2n + 3$	4, 7, 10, 13
$3n + 2$	5, 7, 9,11
$3n + 1$	2, 5, 8, 11
$3n - 1$	5, 8, 11, 14

4 Find the rule for the nth term of each sequence.

a) 4, 8, 12, 16 …

4n

b) 5, 9, 13, 17 …

4n+1

c) 7, 11, 15, 19 …

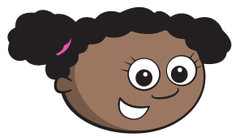
4n+3

d) 2, 6, 10, 14 …

4n-2

What is the same about each sequence? What is different?

5



The nth term for the sequence 11, 14, 17, 20, 23 is $n + 3$ because it is going up by three each time.

a) Do you agree with Whitney? No

Talk about it with a partner.

b) Find the nth term of the sequence 11, 14, 17, 20, 23

3n + 8

6 Complete the table.

Sequence	nth term	50th term	100th term
12, 24, 36, 48	12n	600	1,200
16, 24, 32, 40	$8n + 8$	408	808
4, 13, 22, 31	$9n - 5$	445	895
–7, –1, 5, 11	6n – 13	287	587
-6, -12, -18, -24	$-6n$	-300	-600
–3, –8, –13, –18	-5n + 2	-248	-498

Explain why the 100th term is not always double the 50th term.

7 What is the rule for the nth term of the sequence?

2n + 1

How does the nth term link to the pattern?

8 **a)** Find the nth term of the sequence.

–3, 5, 13, 21 …

8n – 11

b) Does the number 1,001 appear in this sequence?

Explain your answer.

8n – 11 = 1,001 8n = 1,012 n = 126.5

No, n has to be an integer.

9 **a)** Find the nth term of the sequence.

Sequence A 3, 9, 15, 21, 27

6n – 3

b) Generate the first five terms of this sequence.

Sequence B $4n + 3$

7, 11, 15, 19, 23

c) Sequence A and sequence B are added together.

Find the nth term of the combined sequence.

10n

Did you expect this result? Discuss with a partner.

10 Find the nth term of the sequence.

$\frac{2}{5}$ $\frac{9}{20}$ $\frac{1}{2}$ …

$\frac{1}{20}n + \frac{7}{20}$