

Sequences

Starter

1. (Review of last lesson) Solve the equation $2^x - 3x = 32$ to 1 d.p.

Working: *Rearrange the equation so that $f(x) = 0$:* $2^x - 3x - 32 = 0$
 So $f(x) = 2^x - 3x - 32$
 We are given that the solution is between 3.3 and 3.4 these are the first values substituted into $f(x)$

x -value	$f(x)$	Too big/small
5	$2^5 - 3 \times 5 - 32 = -15$	Too small
6	$2^6 - 3 \times 6 - 32 = 14$	Too big
5.5	$2^{5.5} - 3 \times 5.5 - 32 \approx -3.2$	Too small
5.6	$2^{5.6} - 3 \times 5.6 - 32 \approx -0.30$	Too small
5.7	$2^{5.7} - 3 \times 5.7 - 32 \approx 2.88$	Too big
5.65	$2^{5.65} - 3 \times 5.65 - 32 \approx 1.26$	Too big

Since $x = 5.6$ is too small and $x = 5.65$ is too big, the answer must be $x = 5.6$ to 2 d.p.

- E.g. 1** Find the next two terms in the sequence 2, 9, 20, 35, 54.

Working:

2	9	20	35	54
7	11	15	19	
4	4	4		

*1st differences are different
2nd differences are equal*

The second difference are constant so we can continue them.

2	9	20	35	54	77	104
7	11	15	19	23	27	
4	4	4	4	4	4	

$19 + 4 = 23$ $23 + 4 = 27$
 $54 + 23 = 77$ $77 + 27 = 104$

The next 2 terms are 77 and 104

- E.g. 2** Find the next two terms in the sequence 0, 6, 14, 24, 36.

Working:

0	6	14	24	36
6	8	10	12	
2	2	2		

*1st differences are different
2nd differences are equal*

The second difference are constant so we can continue them.

0	6	14	24	36	50	66
6	8	10	12	14	16	
2	2	2	2	2	2	

$12 + 2 = 14$ $14 + 2 = 16$
 $36 + 14 = 50$ $50 + 16 = 66$

The next 2 terms are 50 and 66.

E.g. 3 Find the next two terms in the sequence $-2, 6, 30, 72, 134$.

Working:

-2	6	30	72	134
8	24	42	62	
16	18	20		
	2	2		

*1st differences are different
2nd differences are different
3rd differences are equal*

The third difference are constant so we can continue them.

-2	6	30	72	134	218	326
8	24	42	62	84	108	
16	18	20	22	24		
	2	2	2	2		

$$20 + 2 = 22$$

$$22 + 2 = 24$$

$$62 + 22 = 84$$

$$84 + 24 = 108$$

$$134 + 84 = 218$$

$$218 + 108 = 326$$

The next 2 terms are 218 and 326.

Video: [Describing rules](#)
[The nth term for linear sequences](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook:

p385 M12.6 Qu 8-15, 1-7 odd, 20, 21

A*-G class textbook:

p349 M12.6 Qu 8-15, 1-7 odd, 19, 20

9-1 homework book:

p129 M12.6 Qu 1-15

A*-G homework book:

p97 M12.6 Qu 1-15

[Homework book answers \(only available during a lockdown\)](#)