

# Rules for Sequences

## Maths: Sequences

### Age: 11 and up

The calculator provides a platform whereby students can compare sequences described in different ways. Notably they can build sequences using a term-to-term rule or a position-to-term rule.

First students need to practice identifying sequences using a term-to-term rule e.g. 2, 5, 8, 11, 14, 17, ...

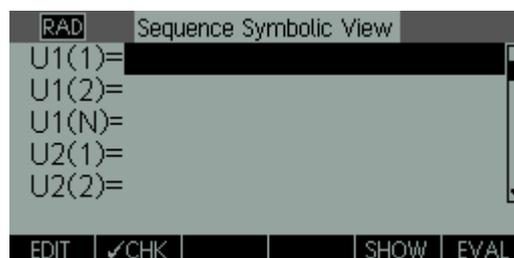
We identify the sequence by its first term (2) and the rule add three to the previous one.

We now need some symbolism, so we call the sequence  $U(n)$

So,  $U(1) = 2$  and  $U(n) = U(n - 1) + 3$

We can enter that into the calculator to check that it works:

Press Apps, navigate to Sequence. Press Reset (F2), OK (F6) and Start (F6)

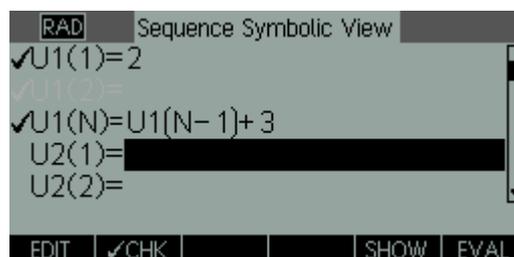


Enter the details into the first sequence U1  
 $U1(1)=3$  then press OK (F6)

Then navigate down to U1(N) and notice that some new options appear at the bottom of the screen to build the function. As soon as you press U1 (F4) you get an option to add the (N-1) (F2) add the 3 and then press OK (F6) to build the function:

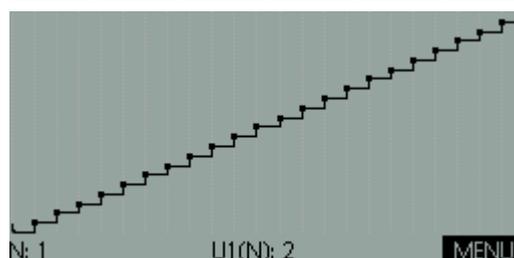
$$U1(N)=U1(N-1)+3$$

Now press Num to see the sequence.



N	U1		
1	2		
2	5		
3	8		
4	11		
5	14		

You can also see the sequence graphically (press Plot), (I have also pressed Views and selected Autoscale for this view) which sets up the conversation to link to continuous linear functions.



Students can then discuss how we might create a rule for this sequence that only makes use of N (the position of the term). Students can try different possibilities using U2, pressing Num to check their ideas and then pressing Symb again and Edit (F1) to make changes to the rule.

Hopefully they will ultimately get to this point:

Sequence Symbolic View		N	U1	U2
✓	$U1(N) = U1(N-1) + 3$	1	2	2
✓	$U2(1) = 2$	2	5	5
✓	$U2(2) =$	3	8	8
✓	$U2(N) = 3 * N - 1$	4	11	11
	$U3(1) =$	5	14	14
		1		
EDIT	✓CHK		SHOW	EVAL
		ZOOM		BIG • DEFN WIDTH3

In this way they can develop their own understanding of the relationship between term-to-term and position-to-term rules. Necessarily they will get used to correct sequence notation and see the nature of graphs of such discrete functions, setting up the move to continuous functions.

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