

# TI-Nspire

## Advanced Sequences

### **Aim**

To explore sequences in more detail

### **Calculator objectives**

By the end of this unit, you should be able to:

- enter sequences of any form
- change the attributes of a plot
- use effectively the plot trace
- use sliders to investigate a family of sequences

### **Contents**

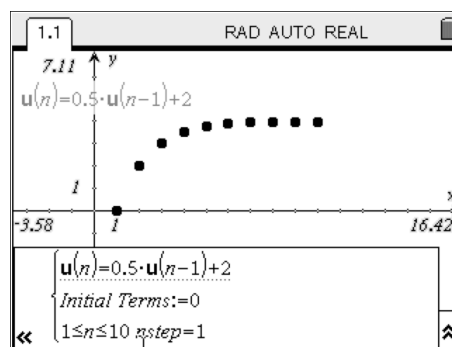
Formulas  
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## Formulas

Just as with graphing functions, you do not need to use the preset dependent variables, i.e.  $u1(n)$ ,  $u2(n)$ , etc...

1. Enter the formula entry bar and clear the preset  $u1(n)$ , and define your own function.

Unfortunately, the independent variable must be  $n$ .

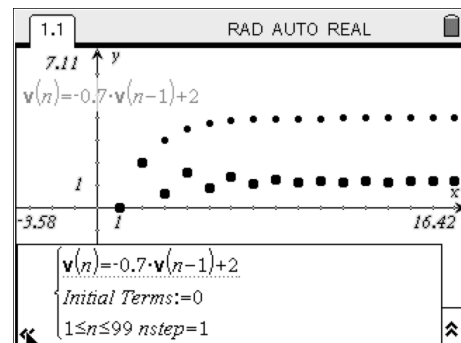


## Sequence attributes

When plotting more than one sequence on a G&G page, the page becomes cluttered fairly quickly. Change the attributes of the plot to distinguish between the sequences.

- Define the sequences:
 
$$u(n) = 0.5u(n-1) + 2$$

$$v(n) = -0.7v(n) + 2$$

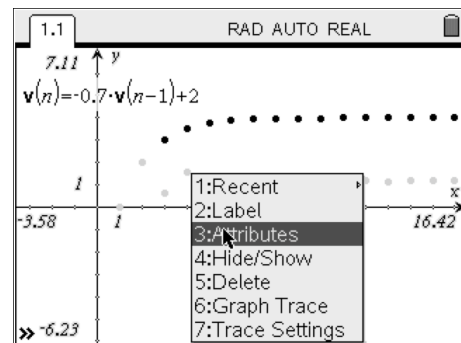


- Move the cursor to on-top of one of the plot points and do a right-click and choose attributes. Press:
 

[CTRL], [MENU], [3:Attributes]

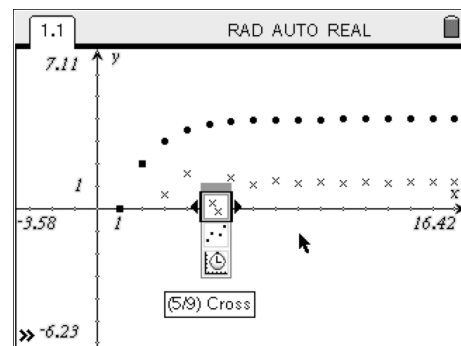
 Alternatively, you can press:
 

[Menu], [1:Actions],[4:Attributes].

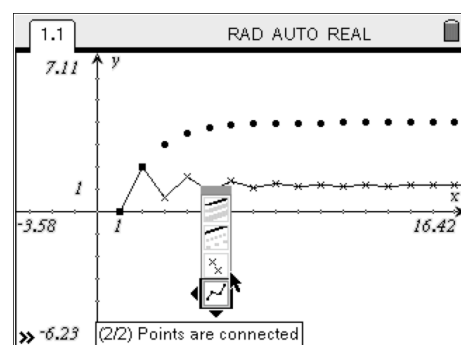


The advantage of the second method of accessing *Attributes* is that you can change the attributes of multiple sequences, not just one.

There are 9 different point styles to choose from:



- You can also connect the points together. Notice if you choose to have the points connected, the attributes menu extends so that you can also change the line style.

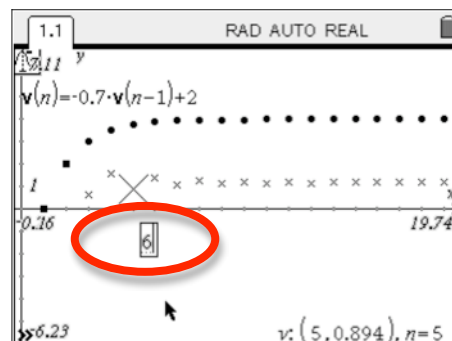


## Graph Tracing

As with function graphing, you can jump to a particular point in a sequence plot when tracing.

1. Choose Graph Trace:  
[MENU], [5:TRACE],  
[1:GRAPH TRACE]

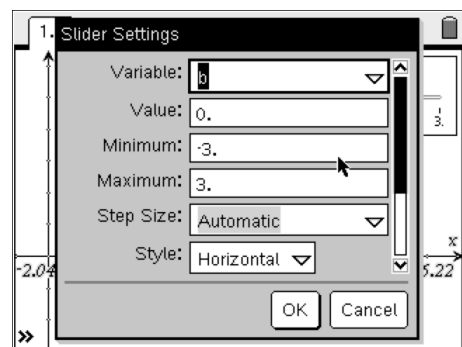
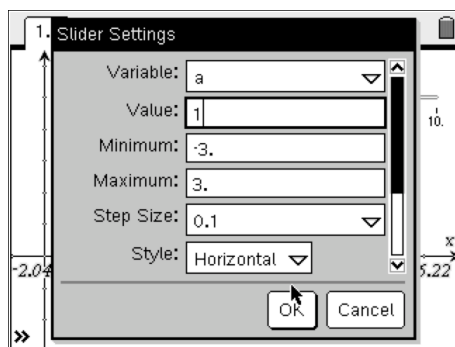
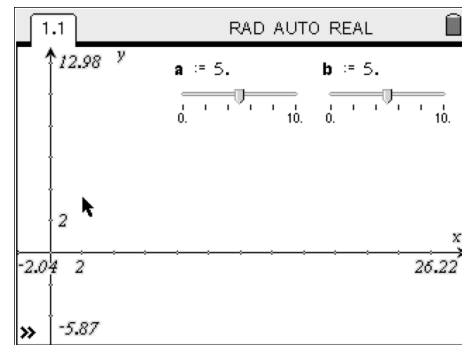
Instead of moving left or right, type a number, then press [ENTER] to jump to that value of  $n$ .



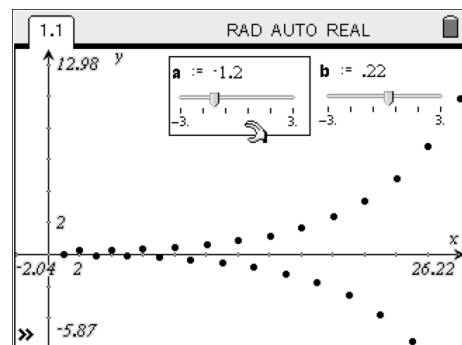
2. When tracing multiple sequences, press up, or down, to move from one sequence to another. The sequence currently being traced is displayed in the top-left of the screen, under the graph trace tool.

## Using sliders to investigate sequences

1. Insert two sliders, with names 'a' and 'b'. Sliders are found in [MENU], [1:Actions], [A:Insert Slider].
2. Edit the sliders by placing the cursor on top of each slider in turn, and press: [CTRL], [MENU], [1:Setings...]



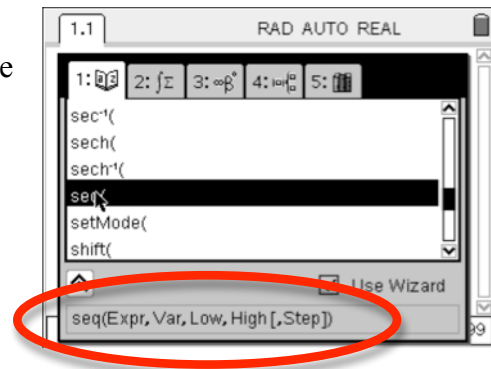
3. Move the sliders to investigate properties of divergent, convergent and oscillating sequences.



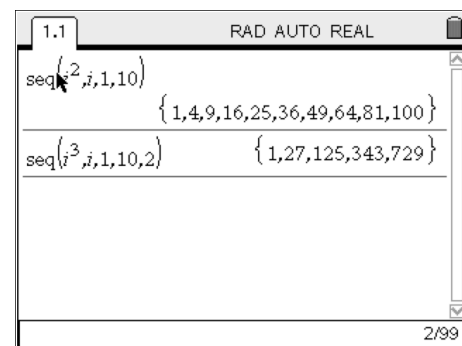
## Sequences and Series in the Calculator APP

The calculator app allows an easy way for sequences to be generated and their series to be calculated.

1. In a calculator page, open the [CATALOG], and scroll down to [SEQ]. Note the syntax and press [ENTER].

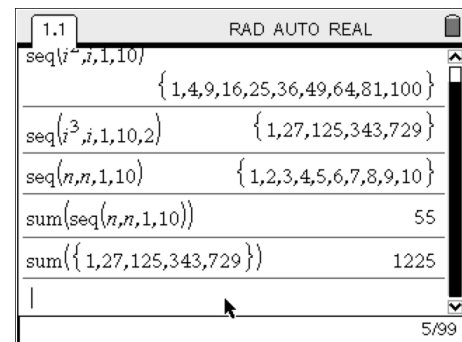


2. Enter the generator for your expression, the variable that your expression is defined in, and the lower and upper bounds. You can also change the step size (see second example which has generated every 2<sup>nd</sup> cube number).

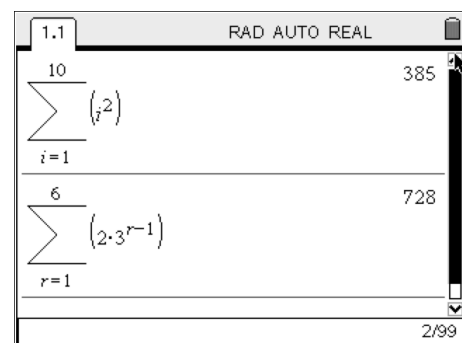


3. To sum a sequence (i.e. a list on the Nspire), either find [SUM] from the [CATALOG], or type “sum”, and sum the sequence. You can either ‘pick up’ the expression to be summed, or the sequence itself.

If you have a sequence defined in a L&S, in a column with label ‘x1’ say, you can also find the sum of that sequence by typing “sum(x1)”.



4. If you do not need to see the sequence, then you can find the sum of the sequence by choosing the summation template from the templates found: [CTRL] + [multiply], and typing the syntax in the usual way.



**Sequences in a L&S page**

**Web plots**

**Inter-dependent sequences**