



### Part 1 – Sequences and Scatter Plots

Press **[stat]** **[enter]** and enter the data shown at the right into L1 and L2.

- L2 shows a finite sequence with six terms.
- L1 shows the term numbers.

L1	L2	L3	L4	L5	2
1	7.5	-----	-----	-----	
2	8.75				
3	10				
4	11.25				
5	12.5				
6	13.75				
-----	-----				

L2(7)=

Find the differences between consecutive terms of the sequence in L2 and record them in L3.

- For the first difference, in the first row of L3, subtract the second term of L2 from the first by typing **L2(2)–L2(1)**. Do this for the next four rows: **L2(3)–L2(2)**, **L2(4)–L2(3)**, etc.

L1	L2	L3	L4	L5	3
1	7.5				
2	8.75				
3	10				
4	11.25				
5	12.5				
6	13.75				
-----	-----				

L3(1)=L2(2)–L2(1)

Now enter the data shown at the right into L4.

- L4 shows a finite sequence with six terms.
- L1 shows the term numbers for this sequence.

Find the consecutive differences for L4 sequence and record them in L5.

L1	L2	L3	L4	L5	5
1	7.5	-----	5	-----	
2	8.75		8		
3	10		13		
4	11.25		21		
5	12.5		34		
6	13.75		55		
-----	-----		-----		

L5(1)=

Graph the sequences in L2 and L4.

Press **[2nd]** **[y=]** [stat plot], and select **Plot1**. Change the settings to those shown at the right.

Plot1	Plot2	Plot3
On	Off	Off
Type: [ ] [ ] [ ] [ ] [ ] [ ]		
Xlist:L1		
Ylist:L2		
Mark : [ ] + [ ] [ ] [ ] [ ]		
Color: BLUE		

Press **[2nd]** **[y=]** [stat plot], and select **Plot2**. Change the settings to those shown at the right.

Press **[zoom]** and select **9:ZoomStat**.

Plot1	Plot2	Plot3
On	Off	Off
Type: [ ] [ ] [ ] [ ] [ ] [ ]		
Xlist:L1		
Ylist:L4		
Mark : [ ] + [ ] [ ] [ ] [ ]		
Color: RED		





### Part 2 – Explicit Formulas and Sums

An **arithmetic sequence** is formed by adding a fixed number, called a **common difference** ( $d$ ), to each previous term (this number can be positive or negative).

The explicit formula for the  $n$ th term in an arithmetic sequence is

$$u_n = u_1 + (n - 1) \cdot d,$$

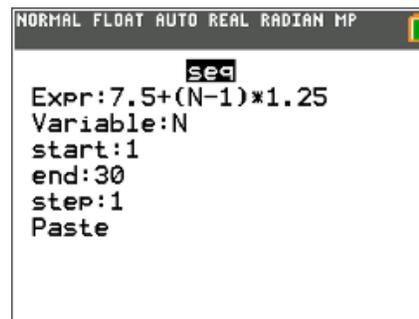
- $u_n$  is any term of a sequence
- $n$  is the term number
- $u_1$  is the first term
- $d$  is the common difference

You can use this formula to calculate any term in an arithmetic sequence.

Generate a sequence in L2 to display the first 30 terms of

$$u_n = 7.5 + (n - 1) \cdot 1.25.$$

- Clear the data from L2, L3, L4, and L5. Leave the natural numbers in L1.
- Arrow to the top of L2 and type and press  $\boxed{2nd} \boxed{stat}$  [list]. Arrow over to the OPS menu and select **seq**(.
- Enter **7.5 + (N-1)·1.25**. Press  $\boxed{enter}$  and input the information on the right, pressing  $\boxed{enter}$  after each entry. Once in the List Editor, Press  $\boxed{enter}$  again.



Note: N is selected by using the  $\boxed{\alpha}$  key.

3. Simplify the formula  $u_n = 7.5 + (n - 1) \cdot 1.25$  by distributing and combining like terms. Use this formula in the sequence command to generate 30 terms of this sequence in L3.

Explain what you notice about the terms in L2 and L3.

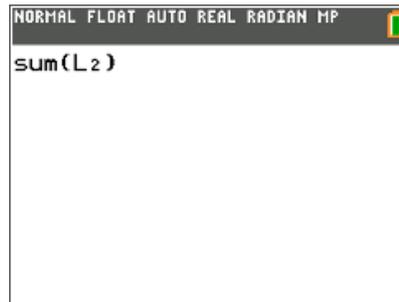


### Part 3 – Practice Finding the Sum of a Series

The expression consisting of summing the terms in a sequence is called a **series**. To find the **finite** sum of the first  $n$  terms of an arithmetic sequence algebraically, you will use the formula:  $S_n = \frac{n}{2}(2u_1 + (n - 1) \cdot d)$  or  $S_n = \frac{n}{2}(u_1 + u_n)$

To check your sum, you can use the handheld and on the home screen enter **sum(L2)**.

The Sum command can be found by pressing  $\boxed{2nd} \boxed{stat} \boxed{[list]}$ , moving to the MATH menu and selecting **sum(**.



4. Find the sum of the first 30 terms of this sequence in  $L_2$  algebraically. Check your result using the **sum** command.

5. Now, let's look at another sequence. Find the sum of the first 80 terms of the sequence below, using the **Lists** feature and the **sum()** command.

62, 67, 72, 77, 82...

a. Find the explicit formula for this sequence in simplified form.

b. Find the sum of the first 80 terms.



### Further IB Extension

The Clemson Tigers football team play in the multilevel Memorial stadium. The closer you are to the field, the higher the ticket prices. The ticket prices for the first 4 rows of a Tigers football game are as follows:

Row 1: \$120 per ticket; Row 2: \$117 per ticket; Row 3: \$114 per ticket

These ticket prices continue in an arithmetic pattern.

- (a) Find the common difference between each consecutive row price. [1 mark]
- (b) Calculate the price of a ticket in row 20. [2 marks]
- (c) Find the total cost of buying 2 tickets in each of the first 20 rows. [3 marks]