## **Problem 1 – Sum of Arithmetic Sequences**

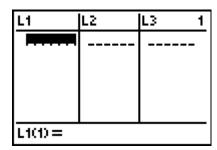
- **Step 1:** Press STAT ENTER and enter the numbers 1 to 10 in list **L1**.
- Step 2: Enter the numbers in reverse order into list L2.
- Step 3: Now, arrow to the top of the L3. Enter L1+L2 by pressing 2nd 1 + 2nd 2 ENTER.

L1	L2	<b>3</b>	
HAMFINGE	9 1987.65 <i>4</i>		
L3 =L1+L2			

- What do you notice about the sums in list L3?
- How do you find the sum of L3 without adding all the values individually?
- How does the sum of L3 compare to the sum of L1?

Repeat the steps above for lists:

Note: You will need to clear L1, L2 and L3 each time by arrowing up to the top of each list and pressing CLEAR.



- Based upon what you have observed from the three previous investigations, conjecture a formula for the sum of an arithmetic sequence.
- Apply the formula to find the sum of the following sequences. Show your work.

0 3, 13, 23, 33, 43, 53, 63, 73, 83, 93, 103, 113

## Problem 2 – Sum of Geometric Sequences

Step 1: Press STAT ENTER and enter the numbers 1, 2, 4, 8, 16 in list L1. Examine L1 to determine the common ratio between the terms.

**Step 2:** Multiply each of the terms in L1 by the common ratio. Arrow to the top of L2 and enter L2\*(your common ratio).

L1	鄆	L3 2	2
1 24 8 16			
L2 =L1*			

Notice the diagonals of the two columns have the same values. If you subtract the values that are the same, only two values remain.

**Step 3:** What is the difference between these two values?

Step 4: What number do you need to divide your difference value in order to get the sum of the values in L1?

Rewrite each value in L1 using the common ratio. How can you find the difference value you calculated only using the values in L1?

**Step 5:** Repeat the steps above for lists:

Remember to clear your lists after each investigation.

Based upon what you have observed from the three previous investigations, conjecture a formula for the sum of a geometric sequence.

Apply the formula to find the sum of the following sequences. Show your work.

$$\circ 1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32} \qquad \qquad \circ 1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81} \qquad \qquad \circ 1, -2, 4, -8, 16, -32, 64$$

$$\circ$$
 1,  $\frac{1}{3}$ ,  $\frac{1}{9}$ ,  $\frac{1}{27}$ ,  $\frac{1}{81}$