Sequence Investigation

Name _____

Class _____

Problem 1 – Create a sequence

1. Write your favorite number here. _____

Type this number into the calculator and press [ENTER]. This is the **1st term** of a sequence.

2. Press [+] [(-)] [3]. Write this number here. _____

This result is the **2nd term** of the sequence.

3. Generate the next three terms of the sequence by pressing [ENTER] 3 more times.

What is your 5^{th} term? _____

What you have done is generate an arithmetic sequence with 5 terms where each term has a common difference of −3.

Problem 2 – Graphically and numerically explore nth term formula

The formula to generate the *n*th term of an arithmetic sequence is $\boldsymbol{a_n = a_1 + (n - 1)d}$.

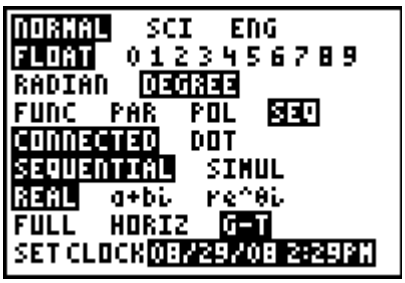
The variable ***n***, determines the number of terms in the sequence.

4. If *n* changes, what effect do you think it has on the graph of a sequence?

Let's explore the effects variables $\boldsymbol{a_1}$ and ***d*** have on the graph of a sequence.

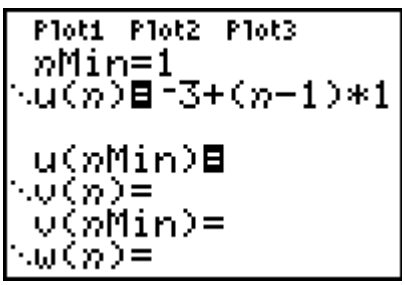
Press [MODE]. Select **SEQ** to set the graphing calculator and then select **G–T** to split the screen into graph/table view.

Press [WINDOW] and set Xmin = 0, Xmax = 10, Ymin = –20, Ymax = 20, and Yscl = 2.



Press [Y=] and enter the arithmetic sequence $a_n = -3 + (n - 1) * 1$.

Note: *n* is entered by pressing [X,T,Θ,n]



Press [GRAPH] to view the table of sequence values as well as its resulting graph.

5. For this sequence, what is the value of $\boldsymbol{a_1}$? _____

6. Experiment with different values for $\boldsymbol{a_1}$ and notice the changes in the graph/table.

What effect does $\boldsymbol{a_1}$ have on the graph? Explain.

Press [Y=] and enter the original arithmetic sequence $a_n = -3 + (n - 1) * 1$.

Press [GRAPH] to view the table of sequence values as well as its resulting graph.

7. What is the value of ***d*** for this sequence? _____

8. Experiment with different values for ***d*** and notice the changes in the graph/table.

What effect does ***d*** have on the graph? Explain

Problem 3 – Summing it up

9. What is the formula for the *n*th term for the sequence you made at the beginning of this activity?

a_n = _____

Graph this sequence and check your answer.