Directions for using the TI-83/84 to compute sums

- Change your calculator to the sequence mode:
  - Type **[MODE]**
  - Use the arrow keys to move to the fourth line and highlight **Seq** and press **[ENTER]**
  - Type **[2nd] [QUIT]**
- Go to the **List** Menu by typing **[2nd] [LIST]**
  - Choose the **Math** submenu
  - Choose option **5:sum(** to paste this command in the home screen.
- Go to the List Menu by typing **[2nd][LIST]**
  - Choose the **OPS** submenu
  - Choose option **5:seq(** to paste this command in the home screen.
    You should see **sum(seq(** on your home screen.
- Enter the terms that you want to sum.
  The syntax is **sum(seq(***sequence_def*, *variable*, *first_value_of_n*, *last_value_of_n*)**)**

  Enter the following exactly as shown **sum(seq(1/n^2,n,1,10)) [ENTER]**

  This should return the value `1.549767731` Enter this value in the table.

  This will compute the following: $\sum_{n=1}^{10} \frac{1}{n^2} = 1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \frac{1}{25} + \frac{1}{36} + \frac{1}{49} + \frac{1}{64} + \frac{1}{81} + \frac{1}{100}$

To avoid re-typing all of this each time you change the *last_value_of_n* or the *sequence_def*, use the **[ENTRY]** button as follows:

- Type **[2nd][ENTRY]** and this will paste your last entry into the home screen.
  [i.e. You should now see **sum(seq(1/n^2,n,1,10))** again on the home screen.]

  - Use the arrow keys to place your cursor over the 0 in the 10.
  - Type **[2nd][INSERT][0]** to insert another zero to make 100. Press **[ENTER]**
    Now it will compute $\sum_{n=1}^{100} \frac{1}{n^2}$. Enter the resulting value in the table.
  - Repeat this process to change the *last_value_of_n* to be 500 and 999 and enter the resulting sums in the table.
    [Notes:
    The more terms you sum, the longer it will take – be patient.
    The TI-83 will only let you compute up to 999 terms otherwise you will get an error.
    If you get see **ERR:OVERFLOW** that means the number computed is too big for the calculator. Enter option **1:Quit** and move on.]

- Type **[2nd][ENTRY]** and this will paste your last entry into the home screen.
  - Use the arrow keys and the **[DEL]** and **[2nd][INS]** buttons to change the line to be **sum(seq(1/n,n,1,10))**

  - Repeat the steps above to compute the sums for *last_value_of_n* =10, 100, 500, 999

Repeat the process as necessary to compute the sums for all of the sequences given in the lab.

Here is the syntax for each sum in the lab (*last_value_of_n* =10) (pay attention to parentheses).

Series/Sum: $\sum_{n=1}^{10} \frac{1}{n^2}$ **sum(seq(1/n^2,n,1,10))** (for sequence: $a_n = \frac{1}{n^2}$)

Series/Sum: $\sum_{n=1}^{10} \frac{1}{n}$ **sum(seq(1/n,n,1,10))** (for sequence: $a_n = \frac{1}{n}$)

Series/Sum: $\sum_{n=1}^{10} \frac{1}{\sqrt{n}}$ **sum(seq(1/√(n),n,1,10))** (for sequence: $a_n = \frac{1}{\sqrt{n}}$)

Series/Sum: $\sum_{n=1}^{10} \left(\frac{1}{2}\right)^n$ **sum(seq(.5^n,n,1,10))** (for sequence: $a_n = \left(\frac{1}{2}\right)^n$)

Series/Sum: $\sum_{n=1}^{10} \left(-\frac{1}{2}\right)^n$ **sum(seq((-.5)^n,n,1,10))** (for sequence: $a_n = \left(-\frac{1}{2}\right)^n$)

Series/Sum: $\sum_{n=1}^{10} 2^n$ **sum(seq(2^n,n,1,10))** (for sequence: $a_n = 2^n$)

Series/Sum: $\sum_{n=1}^{10} \frac{n}{n+1}$ **sum(seq(n/(n+1),n,1,10))** (for sequence: $a_n = \frac{n}{n+1}$)

Series/Sum: $\sum_{n=1}^{10} \frac{n}{n^2+1}$ **sum(seq(n/(n^2+1),n,1,10))** (for sequence: $a_n = \frac{n}{n^2+1}$)

Series/Sum: $\sum_{n=1}^{10} 3$ **sum(seq(3,n,1,10))** (for sequence: $a_n = 3$)