

Graphing Sequences and Series – Using a TI-83

Getting into Sequence Mode:

Turn on your calculator and press MODE. Scroll down to the fourth line and highlight Seq, then press ENTER. Your calculator is now in the sequence graphing mode. If you want to change back to function graphing, you'll have to return to the MODE menu and change things back. Press QUIT (2nd EXIT) to get out of the MODE menu.

Setting the sequence and the partial sum:

Press Y= to begin entering the information about the sequence and series you wish to plot. Suppose, for example, you wish to plot the first 25 partial sums of the harmonic series. We will use $u(n)$ to compute the sequence $a_n = 1/n$ and $v(n)$ to compute the sequence of partial sums $S_n = \sum_{k=1}^n \frac{1}{k}$. Set

$$n\text{Min} = 1$$

On the second line, to the right of $u(n) =$, enter $1 \div n$ (This is the key marked X, T, θ, n ; it will appear on the screen as lower case n when you are in sequence mode.) The second line will read

$$u(n) = 1/n$$

Press ENTER twice to get to the $v(n) =$ line and enter $v(n-1) + 1 \div n$. The fourth line will now read

$$v(n) = v(n-1) + 1/n$$

Note that we are defining the partial sums *recursively*: $S_n = S_{n-1} + a_n = S_{n-1} + 1/n$. For a recursive definition, you must specify the value of the first term. So go to the line $v(n\text{min}) =$ and enter 1 (since $S_1 = a_1 = 1$). Press QUIT (2nd EXIT) to get out of the Y= menu.

Setting the Window: Press WINDOW and insert the following values:

$$n\text{Min} = 1$$

$$n\text{Max} = 25$$

$$\text{PlotStart} = 1$$

$$\text{PlotStep} = 1$$

$$X\text{Min} = 1$$

$$X\text{Max} = 25$$

$$X\text{Scl} = 1$$

$$Y\text{Min} = 0$$

$$Y\text{Max} = 4$$

Setting the Table: Press TblSet (2nd WINDOW) and insert the following values:

$$\text{TblStart} = 1$$

$$\Delta\text{Tbl} = 1$$

You are now “good to go.” Press GRAPH to see the tick marks of the sequence and partial sums displayed on the screen.

Press Trace to view the values of the two plots. The LEFT – RIGHT keys will move to the previous or next tick mark. The UP – DOWN keys will switch between the functions $u(n)$ [which we are using to store the sequence a_n] and $v(n)$ [which we are using to store the partial sums].

Press TABLE (2nd GRAPH) to see the data in tabular form.