22. SEQUENCES

A. Displaying Sequences

I have already mentioned the seq feature on the MATH/MISC menu -- see Section 17. This feature is the easiest way to generate sequences. The command is:

\[ \text{seq}(s(N), N, N, N, I), \]

where

- \( s(N) \) is the algebraic expression for the sequence,
- \( N \) is the variable to be incremented,
- \( N_1 \) is the first or starting value of \( N \),
- \( N_2 \) is the last value of \( N \), and
- \( I \) is the amount by which \( N \) is to be incremented, usually 1.

For the sequence \( s_n = \frac{3n}{4n+1} \), the command is

\[ \text{seq}(\frac{3N}{4N+1}, N, 1, 10, 1) \]

This will return the first ten sequence values in a list. If you do not want to see all 12 digits displayed, you can do a couple of things.

(a) Round off: Select MATH/NUM/round. The command is

\[ \text{round}(\text{ANS}, 3) \ \text{ENTER}. \]

This is rounding after the fact. Before you enter the seq command, you could select Float 3 from the MODE menu. While you are in this mode, the calculator displays all numbers to three decimal places, even integers, unfortunately.

(b) Convert to fractions: Select MATH/MISC/Frac. The command is

\[ \text{ANS} \ \text{Frac} \ \text{ENTER}. \]

In the particular example given here, it is easier to see the convergence to \( \frac{3}{4} \) by using decimals.

Instead of displaying the sequence values in a list, it may be instructive to have the values displayed one at a time. You can do this as follows: First store a value to \( N \) which is one less than the starting value of \( N \). For the example above,

\[ 0 \ \text{STO} \ N \ \text{ENTER} \]
\[ \text{N+1} \ \text{STO} \ N \ : \ (3N)/(4N+1) \]

Press ENTER repeatedly to display the values. To display the values as fractions, insert \( \text{Frac} \) at the end of the second command line above. If you want to round off, you could replace the last command by

\[ \text{round}((3N)/(3N+1), 3) \]

If you want the calculator to keep count for you, you could do the following:
0 \textit{STO> N ENTER} \\
N+1 \textit{STO> N: \{N, (3N)/(4N+1)\} }