TI-83 and TI-89 Sequence and Series Handout

NOTE: I do not use these features regularly on these calculators (even less on the TI-89), so if you have any tips/changes to add, please let me know.

There are 2 main ways to work with sequences and series on the calculators. One is through the LIST feature (2nd Function STAT). The second is by changing the calculator MODE to Seq (instead of Functional, Parametric or Polar.)

Listing terms of a sequence or series
You can either have the calculator list them off or you can store these terms in a list.

TI-83: the seq feature can be found under LIST OPS, 5: seq(.
TI-89: the seq feature can be found under MATH (2nd 5), 3:List, 1:seq(.

- Syntax is seq(*formula, variable, start, stop, step*).

- For our purposes, *step* will always be 1.

- If you have *start = stop*, it will return just that term of the series.

- For the TI-83, you can use an ALPHA character or if in SEQ MODE, you can use the *n*-variable (the $\boxed{\text{X,T,}\theta\text{,n}}$ button). For the TI-89, you can either use the ALPHA characters or any of the X,Y,Z,T buttons.

Example: The sequence $\{\frac{1}{n!}\}$:
Listing off the first 5 terms on the home screen:
    seq(1/A!, A, 1, 5, 1) ENTER
TI-83: Storing the first 5 terms in list 1: (storing terms in a list on TI-89 not discussed here)
    seq(1/A!, A, 1, 5, 1) STO▶ $L1$ (2nd Func 1) ENTER
seq(1/A!, A, 5, 5, 1) will return the 5th term of the sequence.

Finding partial sums of a series
Again, there are several ways you can do this.

Example: Finding the fifth partial sum (s_5) of the series $\sum_{n=1}^{\infty}\{\frac{1}{n!}\}$:

On home screen, enter:
    sum(seq(1/A!, A, 1, 5, 1)) ENTER
    TI-83: the sum feature can be found under LIST MATH.
    TI-89: the sum feacture is found under MATH (2nd 5), 3:List, 6:sum(.

OR, for the TI-83, if you had stored the first five terms in a list (see above), you can do 1-variable calculations on that list (under STAT CALC) and one of the calculations is the sum of the terms of the list ($\sum x$).

OR, for the TI-89, press F3:Calc, 4: Σ(sum. The syntax is Σ(formula, variable, start, stop).
Example: $\Sigma(1/x, x, 1, 5)$ ENTER would return $\frac{137}{60}$ for $\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5}$.

In Sequential Mode

Under Sequential Mode, you can define sequences using the Y= feature:

Example: working with the sequence $\{\frac{1}{n!}\}$:

Press $\boxed{\text{Y=}}$. You'll see

TI-83: nMin=, $u(n) =, u(n\text{Min})=$, etc. If you want your sequences to start with $n = 1$, make sure nMin =1. The $u(n\text{Min})$ feature is only used with recursively defined sequences.

TI-89: $u1 =, ui1 =$, etc.

With the cursor at the $u(n) =$ or $u1 =$ spot, type:

$1/n!$

On the TI-83, the variable n can be found on the $\boxed{\text{X,T,}\theta,n}$ button. Note that this is different from the seq feature in which the variable could be an $\overline{\text{ALPHA}}$ character. On the TI-89, use alpha-N as your variable and leave $ui1 =$ blank.

Listing off the first 5 terms:

TI-83: The sequences u, v, w can be found as 2nd Function 7, 8 and 9, respectively.

Type $u(1,5)$ to list off the first 5 terms.

Type $u(5)$ to return just the fifth term.

Partial Sums

Example: working with the series $\sum \frac{1}{n!}$.

Press $\boxed{\text{Y=}}$.

On the TI-83: at $u(n) =$, type sum(seq(1/A!, A, 1, n, 1)) ENTER.

On the TI-89: at $u1 =$, type $\Sigma(1/x!, x, 1, n)$ ENTER (find the Σ under CATALOG).

Now to find the fifth-partial sum, you can use the CALC or TRACE feature with $n = 5$.

OR, on the TI-83, on the home screen type: $v(5)$.

Graphing both a_n and s_n:

Assuming you've defined the terms as the one sequence and the partial sums as the another sequence (as in the examples above), you can graph them both at the same time.