

TI Lab 9: Sequences and Series

IN THIS LAB, YOU WILL: GENERATE A LIST OF TERMS IN A SEQUENCE;
FIND THE SUM OF A FINITE NUMBER OF TERMS IN A SEQUENCE;
GRAPH A SEQUENCE; AND
USE A PROGRAM THAT FINDS THE SUM OF FINITE TERMS
OF A GEOMETRIC SERIES.

1. Your calculator can generate terms of a sequence easily and quickly. Go to the LIST menu (2nd STAT) and over to OPS. Choice 5 is the sequence command. The format for the sequence command is $\text{seq}(\text{sequence}, \text{variable}, \text{start}, \text{end}, \text{increment})$, where *start* and *end* refer to the term numbers and *increment* tells the calculator how to count from start number to end number. For instance, the first 4 terms of the sequence $1/n$ are given in the figure below. Note that you can change the sequence to fractions and store the sequence as a list.

```
seq(1/X,X,1,4,1)
(1 .5 .33333333...
seq(1/X,X,1,4,1)
Frac
(1 1/2 1/3 1/4)
```

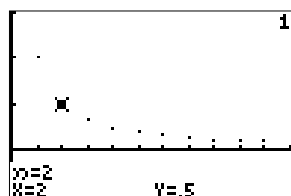
```
seq(1/X,X,1,4,1)
→L1
(1 .5 .33333333...
L1→Frac
(1 1/2 1/3 1/4)
```

2. Your calculator can also graph terms in a sequence. To do this, your calculator's MODE must be Seq and Dot. When you press the Y= button, you get the screen shown below. n_{Min} is the starting value of n and $u(n)$ is the sequence. The window screen is different as well. In addition to the x and y scales, you have n_{Min} , n_{Max} , PlotStart and PlotStep. Clearly, the range of n values you wish to graph is n_{Min} and n_{Max} . PlotStart is the n value you wish to begin graphing and PlotStep is the increment. Finally, pressing the graph button produces a graph over which you may trace values. The table is also available in Seq mode as well.

```
Normal Sci Eng
Float 0123456789
Radian Degree
Func Par Pol Seq
Connected Dot
Sequential Simul
Real a+bi re^θi
Full Horiz G-T
```

```
Plot1 Plot2 Plot3
nMin=1
u(n)=1/n
u(nMin)=
v(n)=
v(nMin)=
w(n)=
w(nMin)=
```

```
WINDOW
nMin=1
nMax=10
PlotStart=1
PlotStep=1
Xmin=0
Xmax=11
Xscl=1
```



n	$u(n)$
1	1
2	.5
3	.33333
4	.25
5	.2
6	.16667
7	.14286
$n=1$	

3. To find the sum of some finite amount of terms, go to the LIST menu and over to MATH. Choice 5 is sum. The figure below shows the format to obtain the sum of terms in a sequence.

```
sum(seq(1/X,X,1,
4,1))Frac 25/12
sum(seq((-1)^X/X
,X,1,4,1))Frac -7/12
```

```
sum(seq(3X-J(X),
X,1,40,1))
2288.384212
sum(seq(4(.8)^X,
X,1,50,1))
15.99977164
```

4. The program **SERIES** combines the summing and graphing features in one program—however, it is only good for geometric sequences. Here, we run the program on the geometric sequence $\{4(0.8)^n\}$. The advantage to using this program is that it will give you the value of the infinite sum (if the geometric series converges), and it graphs the partial sums so that you may observe the convergence or divergence of the series.

```
FIRST TERM=A
RATIO=R
NO. OF TERMS=N

A=?4
R=? .8
N=?50■
```

```
PRESS ENTER TO
SEE SUCCESSIVE
TERMS OF SERIES
```

```
4
16/5
64/25
256/125
1024/625
4096/3125
1.048576
```

```
2.722258935E-4
2.177807148E-4
1.742245719E-4
1.393796575E-4
1.115037226E-4
8.920298079E-5
7.136238464E-5
```

