

MATH 1311

Section 2.1

Tables and Trends

The goal of this section is to use our calculator to create a table from a function given by a formula, and then analyze the table for trends and limiting values.

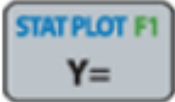
We can create a table by entering values of the variables and calculating the function values at given points one at a time, OR, we can let the calculator do the work.

We need to learn to let the calculator do the work!!

By constructing a table of values for a function (we will use the TI for this)

- We can find limiting values (we saw this earlier in chapter 1)
- We can estimate max/min values

Skill #1: Entering a Function formula into the calculator

Press  and enter the formula in Y₁.

Enter your function using the variable key for “x” not the letter key or the multiplication key!

Example 1:

Here is what it looks like when I enter the function $y = \frac{12.36}{0.03+0.55^x}$

```
Plot2 Plot3
\Y1=12.36/(0.03+
.55^X)
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
```

Example 2:

Enter the function $N(t) = \frac{6.21}{0.035+0.45^t}$

Skill #2 Creating a Table from a Function

Steps to Creating a Table

1. Enter the function into the Y= window.
2. Select the function you want to create a table for by positioning the cursor over the equals signs on that function.
3. Press



to select how you want the table to look:

The TblStart = 0 means the first x value in the table will be 0. Put your cursor over the 0 and enter a different number if you want the table to start at a different value.

The Tbl 5 means that each x entry in the table will be 5 units bigger than the last one. Put your cursor over the 5 and change this number if you want values at different intervals.

You can leave the AUTO settings on the last two lines for the moment.

4. Press   to see the table.

5. You can scroll up and down to see various values of the function.

```
Plot1 Plot2 Plot3
/Y1=
/Y2=
/Y3=
/Y4=
/Y5=
/Y6=
/Y7=
```

```
TABLE SETUP
TblStart=30
ΔTbl=5
Indent: Auto Ask
Depend: Auto Ask
```

X	Y1	
30	30	
35	35	
40	40	
45	45	
50	50	
55	55	
60	60	

Press + for ΔTbl

c. What is the advantage of seeing $N(t)$ as t goes from $0,1,2,3,4,5,\dots$? What is the advantage of seeing the table when t increases by 5 each time?

d. Is there a limiting value?

Skill #4 Optimal Values from a Table

We can also use a table to find the maximum or minimum value of a function over a particular interval.

Example 5: Suppose $f(x) = 50 - 9x + \frac{x^4}{30}$ is a function modeling a situation that only makes sense for whole number inputs between 0 and 10. What is the minimum value of f and for what input does this occur?

Example 6: A model for the number of students in public high schools in the U.S. x years after 1986 is $N(x) = 0.05x^2 - 0.42x + 12.33$ million students. The model is only valid from 1986 to 1996.

- Construct a table showing all values of this function.
- Calculate and explain the meaning of $N(8)$.
- In what year was enrollment the lowest, and what, according to the model, was the enrollment in that that year?

