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 $Y_1$.

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 $y = \frac{12.36}{0.03+0.55^x}$

**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 $\text{2ND} \text{ WINDOW}$ 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 ΔTbl = 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 \[ \text{2ND} \ \text{GRAPH} \] to see the table.

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

Example 3: For the function \( N(t) = \frac{6.21}{0.035 + 0.45^t} \)

a. Create a table starting at 0 and increment by 1 each time.

b. Create a table starting at 0 and increase by 5 each time.

c. What is the advantage of seeing \( N(t) \) as \( t \) goes from 0, 1, 2, 3, 4, 5, \ldots \)? What is the advantage of seeing the table when \( t \) increases by 5 each time?
d. Is there a limiting value?

Skill #3 Spotting Trends – Limiting Values

**Example 4**: Construct a table for \( f(x) = \frac{4x^2 - 1}{7x^2 + 1} \). Start with 0 and use an increment of 20, use it to determine the limiting value of \( f \).

a. What do you notice as \( x \) gets larger?

b. What is the limiting value of the function?

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.

a. Construct a table showing all values of this function.

b. Calculate and explain the meaning of $N(8)$.

c. In what year was enrollment the lowest, and what, according to the model, was the enrollment in that year?
Example 7: An enterprise rents out paddleboats for all-day use on a lake. The owner knows that he can rent out all 27 of his paddleboats if he charges $1 for each rental. He also knows that he can rent out only 26 if he charges $2 for each rental and that, in general, there will be 1 less paddleboat rental for each extra dollar charged per rental.

a. Construct a formula for the total revenue as a function of the amount charged for each rental.

b. Construct a table for the revenue function in part (a) and determine how much the owner should charge to get the largest revenue. What is this largest revenue?