

Continuation of Fridays lecture about Limits

Here is how to make a table of values of evaluating a limit. $\lim_{x \rightarrow c} f(x) = L$

We want to show by using a table that as $x \rightarrow c$ from both directions $f(x) \rightarrow L$.

Finding one value near c does not show an approach.

You will make 2 columns with “titles” (what the column represents)

In the input column (usually on the right) you will write at least 6 inputs showing these are approaching the c -value. Start with a value near “ c ” and get closer.

Using your calculator (Evaluate program or the value function key on the calculator) you will place the corresponding output to their input. Please observe that as x approaches c verify if the y ’s are approaching a number. If L exists one has approximated the limit.

Any graphic or table approach is just an approximation but it should be a very good approximation.

Example

Evaluate $\lim_{x \rightarrow 0} (1 + x)^{\frac{1}{x}}$

Place in number near “ c ”

$c = 0$ so a value near 0.

Get closer by factors of 10

Leave a few spaces

incase you need to get smaller.

Never place the “ c ” into the

table. Remember we don’t care about the value of $f(c)$.

x	$(1 + x)^{\frac{1}{x}}$
-.001	
-.0001	
-.000001	
.000001	
.0001	
.001	

Write the function you place into the calculator to evaluate. Do not write just “ $f(x)$ ”.

Now evaluate the function at your suggested inputs

x	$(1 + x)^{\frac{1}{x}}$
-.001	2.731999
-.0001	2.7184178
-.000001	2.718232
.000001	2.7182805
.0001	2.7181459
.001	2.7169

lots of decimal places
The closer x gets to c more decimal places you need.

Observe that the input on the left is approaching 0 and the outputs seem to be approaching $2.718 \approx e$

Should see at least 3 decimal places repeated at least 3 times and one on each side of “ c ” before conclusion can be made. If you can’t tell yet you might need to get closer.

Conclusion is $\lim_{x \rightarrow 0} (1 + x)^{\frac{1}{x}} = e$

I would like you to work on WS 8, it is not hard just time consuming, filling in tables and making graphs.

Attached is how to evaluate a limit by making a table of values.

WS 8

1 make tables, find the limit if it does exist.

2. Make a good graph and make a decision. Graph 3 is a continuous function. Make sure you draw one.

#3 Draw graphs that have those characteristics, use today's handout for hints

#4&5 Combines 1.7 and 1.8, If the denominator equals zero for a particular input " c ". " c " is not in the domain. If we want " c " to be in the domain, we just assign it a value other than the function. If we assign the value to be the limit of the function as x approaches " c ", we plug up the hole and make the function continuous. You will be making a table of values to find the limit. This is what you did in 1.7 using algebra.

Try and we can discuss it on Monday. On Monday we will start to evaluate using correct notation.

Mrs Wood