

Math 151 Group Project – Definition of Limits

Names of all group members: _____

Directions:

(1) Find each limit, using whatever method works. You don't have to just use the flowchart, **and on some of them it won't work.**

(2) Use a graphing calculator to find how close x has to be to the number x is approaching so that $f(x)$ is within 0.03 of the limit. (In other words, in our fancy formal definition of limits, I'm giving you an ϵ distance of 0.03, and you have to find the associated δ distance.)

Example: Since $\lim_{x \rightarrow 2} (2x + 5) = 9$, you would have to find a number δ so that

$|(2x + 5) - 9| < 0.03$ (i.e. the distance between the graph of $2x + 5$ and height 9 is less than 0.03) whenever $|x - 2| < \delta$ (i.e. whenever x is closer than this distance δ to 2.).

Comments: (1) Be very careful computing the limits. If you get one wrong, you have no hope whatsoever of getting the rest of the problem done correctly. It just won't work if you're looking for the wrong limit, and you'll get zero on that question. **CALCULATOR IN RADIAN MODE!**

(2) You have to give me some idea of where you got your answer from – please include some sort of graph that indicates how you got δ . Also, please use at least FOUR decimal places.

(3) Remember that this is a GRAPHING calculator assignment, meaning the whole point is to look at the graphs of the functions. Don't just plug in a bunch of numbers and make a guess for what δ should be.

1) $\lim_{x \rightarrow 4} \frac{2 - x}{x - 3}$

$$2) \lim_{x \rightarrow 0} \frac{5e^x - 5}{2x}$$

$$3) \lim_{x \rightarrow 3} \frac{x^2 + 2x - 15}{2x^2 - 18}$$

$$4) \lim_{x \rightarrow 0} \frac{4 \sin x}{8x}$$