

Topics in Calculus: Limits and Continuity

Finding Limits

NCTM Principles and Standards

- **Content Standard:** Represent and analyze mathematical situations and structures using algebraic symbols
- **Process Standard:** Use representations to model and interpret physical, social, and mathematical phenomena

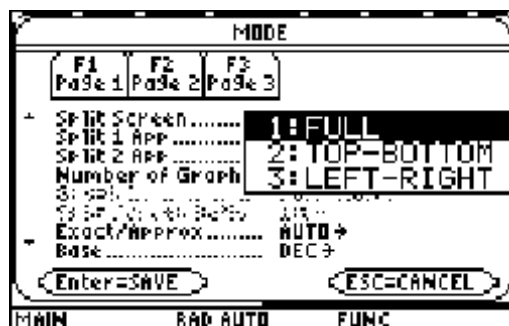
Find $\lim_{x \rightarrow 3} (x + 4)$:

- Press **F3** **3** to select limit and enter the function, the variable, and the number.

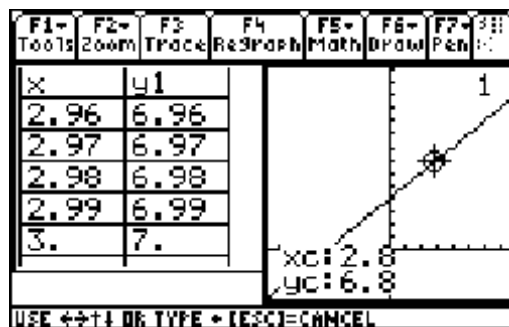


- Use a table of values and a graph to support the answer.

To view the graph and table on a split screen press **MODE** **F2** **3** to choose a left-right split. Press **ENTER** to save the change in mode.

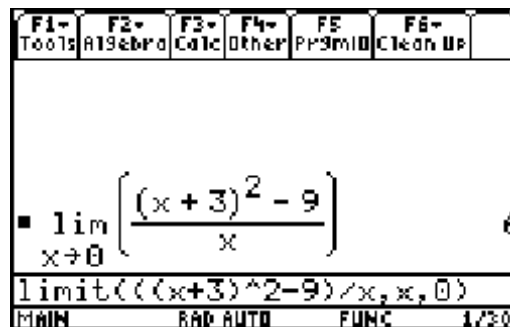


Alternate between the table and the graph by pressing **2nd** **APPS**. Look at the border and/or the menu tabs to determine which application is active. Press **F3** in the graph screen to trace the function and observe values of $f(x)$ as x approaches 3. Examine values as x approaches 3 from both the left and the right.



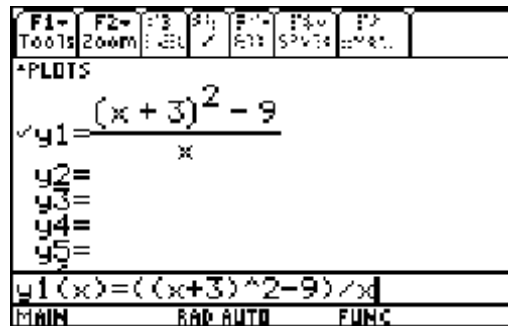
Find $\lim_{x \rightarrow 0} \frac{(x+3)^2 - 9}{x}$

- Press **F3** **3** to select limit and enter the function, the variable, and the number.

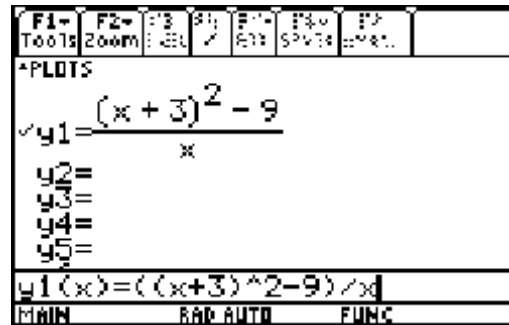
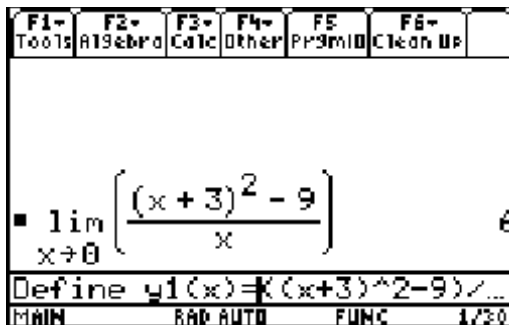


- Use a table of values and a graph to support the answer.

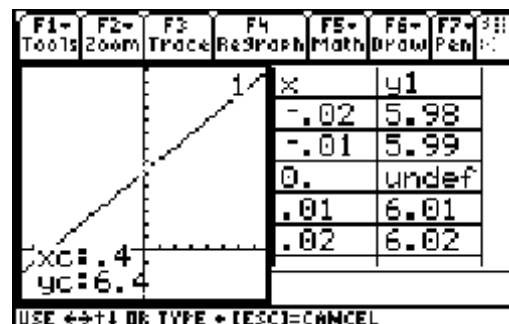
Either type the function in y1 or define it by editing the expression on the home screen.



To edit the limit expression, place the cursor at the right side of the expression and press **←** to delete `)0,x,.` Press **⬅** to move the cursor to the left so that it is between the first 2 left parentheses and press **←** to delete `9` until. Leaving the cursor at the left press **F4** **1** to paste in the define command then type `y1(x)=` and press **ENTER**.

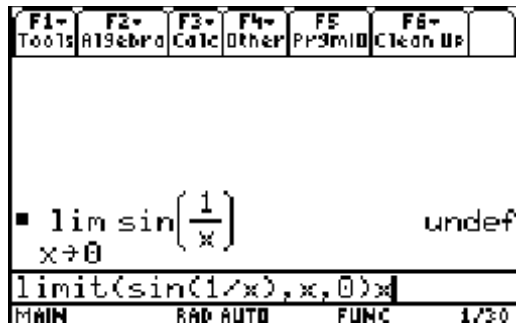


Trace the graph and scroll through the table to support the answer.

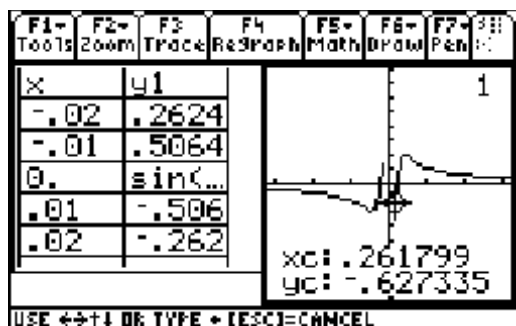
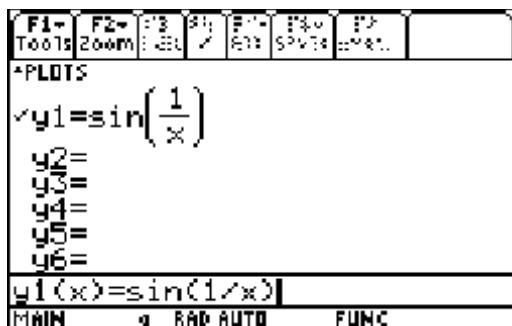


Find $\lim_{x \rightarrow 0} \sin \frac{1}{x}$

- Press $\boxed{F3} \boxed{3}$ to select limit and enter the function, the variable, and the number.



- Use a table of values and a graph to support the answer.



Students should always find limits analytically when possible then use the TI-89 to support their analytic solution.