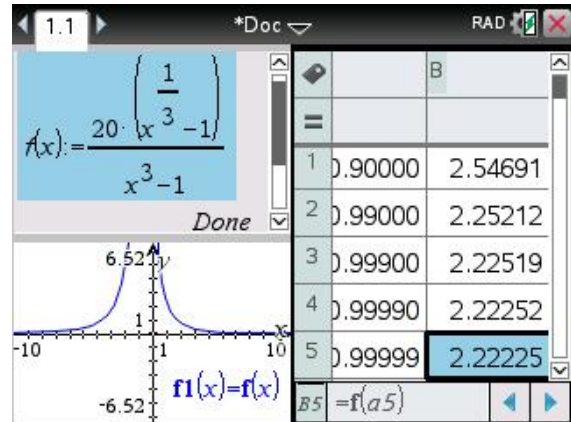


## Using a Table to Approximate a Limit

### TI-nSpire CX CAS

In the following, an item in bold brackets, e.g., **[enter]**, represents a key on the nSpire's keypad.



1. Open a new or existing document and insert a Calculator Page.
  - a. New document: **[home] – New Document – Add Calculator.**
  - b. Existing document, insert a new problem: **[doc] - Insert – Problem – Add Calculator.**
2. We want to estimate  $\lim_{x \rightarrow 1} [20 \cdot (x^{1/3} - 1)/(x^3 - 1)]$  using a list of values, so define the function,  $f(x)$ , on the Calculator Page, by typing:  $f(x) := 20 \cdot (x^{1/3} - 1)/(x^3 - 1)$  **[enter]**
3. Change the page layout to 3 panels (two on the left, one on the right): **[doc] – Page Layout – Select Layout – Layout 6.** Note: the panels could just as easily be set up as separate pages in the same problem, but putting them all on one page shows lots of cool stuff on a single screen.
4. Move to the right panel. **[ctrl] – [tab]**
5. Add a Lists and Spreadsheets page: **[menu] – Add Lists & Spreadsheet**
  - a. In column A, enter some  $x$ -values approaching 1. (Alternatively, you could enter a starting value and increment additional values with a formula.)
  - b. In column B, move to cell B1. Define cell B1 by typing:  $= f(A1)$  **[enter]**. Next, copy the formula in B1 to B2-B5 (Move to B1, **[ctrl] – [menu] - copy**. Move to B2. Hold down **[shift]** and use the down arrow key to move to B5; release **[shift]**. Then, **[ctrl] – [menu] – [paste]**. Voila!).
  - c. The limit we seek is approximated by the value highlighted in blue on the bottom right of the screen. The limit appears to be approaching  $2.22\bar{2} = \frac{20}{9}$ .
6. Move to the bottom left panel: **[ctrl] – [tab]**
7. Add a Graphs Page: **[menu] – Add Graphs.** Type  $f(x)$  in the function definition line, then **[enter]**. You may choose to zoom in, **[menu] – Window/Zoom – ZoomIn**, to get a close up of the function near  $x = 1$ .

If this file is saved, **[doc] – File – Save As – (choose file name) – Save**, it is ready to be re-used with any function. Just re-define  $f(x)$  in the upper left panel and change the entered values in column A of the list in the right panel. That would save a lot of time on similar problems in the future.