EXPLORE! UPDATE

Explore! Updates are included at the end of each chapter of this textbook. These Updates provide additional instructions and exercises for using a graphing utility to explore calculus or the solutions for selected Explore! boxes found in each chapter. An attempt has been made to use function keys that are standard on most hand-held graphing utilities. The exact names of the function keys on your particular calculator may vary, depending on the brand. Please consult your calculator user manual for more specific details.

SOLUTION FOR EXPLORE! EXERCISE ON PAGE 3

Store $f(x) = x^2 + 4$ into your graphing utility. Evaluate at $x = -3, -1, 0, 1, 3$. Make a table of values. Repeat using $g(x) = x^2 - 1$. Explain how the values of $f(x)$ and $g(x)$ differ for each x value.

Write $f(x) = x^2 + 4$ in the function editor (**Y=** key) as **Y1** $= x^2 + 4$. You can calculate functional values, such as **Y1**(-3) by accessing the functional notation feature of your calculator. Press the VARS key. Then press the right arrow key until **Y-VARS** is highlighted, and select **1:Function** and **1:Y1**. Make sure that you are on the Home Screen when obtaining the **Y1** symbol.

From the Home Screen (2nd MODE), you can also obtain a list of functional values, using **Y1** ($\{-3, -1, 0, 1, 3\}$), where the pair of braces { } (above the parenthesis keys) encloses the listed values, as shown in the figure.

Note

An Explore tip is that it is easier to view this list as a table of values through the table option, making sure to set up the table parameters through the **TBLSET** menu (2nd **WINDOW**).
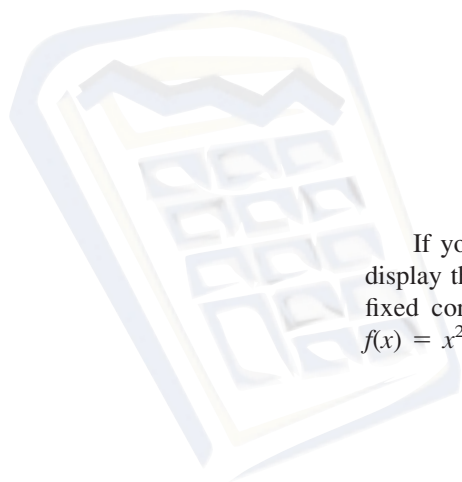
If you enter **Y2** $= X^2 - 1$ into the equation editor (**Y=**), the table window will display the functional values for this new function. Notice that the values differ by a fixed constant of -5, since the two functions are simply vertical translations of $f(x) = x^2$.

SOLUTION FOR EXPLORE! EXERCISE ON PAGE 79

Graph $f(x) = \dfrac{x^3 - 8}{x - 2}$ using a standard window. Does this graph appear continuous? Now use a modified decimal window $[-4.7, 4.7]1$ by $[0, 14.4]1$, and describe what you observe. Which case is this most like in Example 6.3 (p. 77)?

The graph appears continuous using a standard window (select Z Standard from the **ZOOM** menu). Examination of the graph using the decimal window $[-4.7, 4.7]1$ by $[0, 14.4]1$, however, shows an exaggerated hole at $x = 2$. (The decimal window can also be selected from the **ZOOM** menu.)
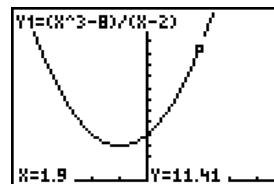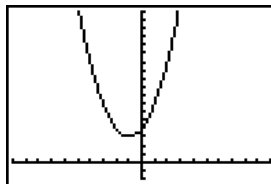
The function is not continuous, specifically at $x = 2$ where it is not defined. This case is similar to Example 6.3, part (b). What value of y would fill up the hole in the graph? Answer: $\lim_{x \to 2} f(x) = 12$.