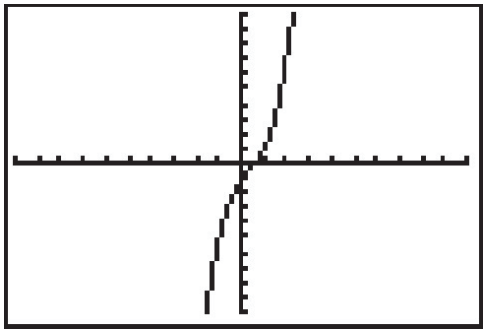
Using the Zero Function

Problem: Solve the equation:

$$x^3 - x^3 + 2x^2 - 1 = 0$$

graphically.

Solution: First, we let $y = x^3 - x^2 + 2x - 1$ and graph this equation in the standard window:



The solution to the given equation is the x-intercept of the above graph (i.e. when $y = 0$). To find the x-intercept, we will use the *zero* function:

(1) Access the `CALC` menu by pressing `2ND` and then `TRACE`.

(2) Scroll down to `2:zero` and press `ENTER`.

(3) You are asked for a left bound. To answer the question, you may do one of two things:

   (a) Enter the x-coordinate of a point on the graph to the left of the x-intercept (say, $x = 0$) OR

   (b) Use the scroll buttons to move the cursor along the graph until the cursor is to the left of the x-intercept.

   Press `ENTER`.

(4) You are asked for a right bound. Perform one of the steps in (3), replacing the word "left" with "right." If you enter an x-value, you can choose, say, $x = 1$.

(5) You are asked for a guess. You may either:

   (a) Enter the x-coordinate of a point on the graph that is very close to the x-intercept (say, $x = 1$) OR

   (b) Scroll along the graph until the cursor is near the x-intercept.

   Press `ENTER`.

The calculator will give you the x and y coordinates of the point where the graph intersects the x-axis:

`Zero : x = 0.56984029, y = 0`