


## 2 Functions





### 2.3 Graph a function

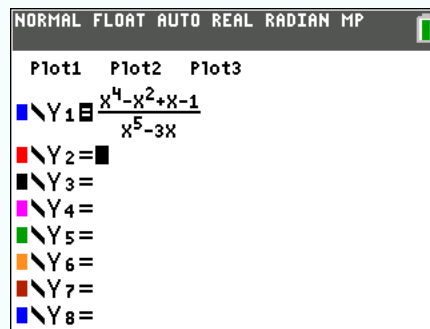
Suppose you want to have a good graphical understanding of the function

$$f(x) = \frac{x^4 - x^2 + x - 1}{x^5 - 3x}.$$



#### 2.3.1 Put the function in your calculator





Enter the function with the  button.


Tip1: You can create a fraction by pressing , , , .



#### 2.3.2 Display the graph of a function correctly

tip1: Make sure only the functions you're using are displayed. To deactivate/activate a function's display, press , and go to the function you want to activate/deactivate. highlight the "=" symbol and press  ("▢" means it's activated, "=" means it's deactivated).

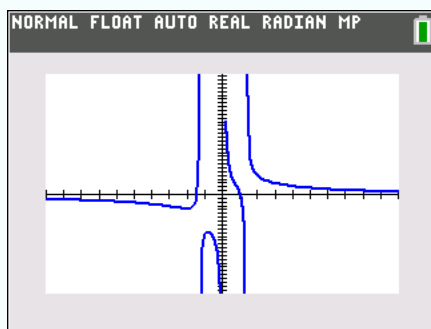
Tip2: When the calculator is drawing the graph of a function, it locks itself from doing anything else until the loading symbol  next to the battery symbol  ends. If you want to abort the drawing, press , .

- Press  and select **Xmin**, **Xmax** according to the problem you want to solve. Since here it is hard to know, we try **Xmin: -10** and **Xmax: 10**.


Choose an **Xscl** more or less twenty times smaller than the gap between **Xmin** and **Xmax** (the role of **Xscl** is to set the distance between tick marks on the  $x$ -axis). Usually we set **Xscl** to be powers of 10.

- ② Choose **Ymin** and **Ymax** according to the problem chosen. You want **Ymin** a bit smaller than the minimal  $y$ -value desired, and **Ymax** a bit above the maximal  $y$ -value desired.

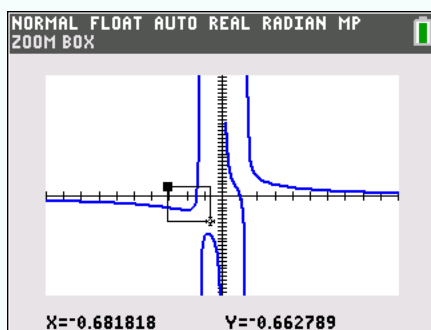
If you don't know what  $y$ -values to choose, press format f3 **zoom** **ZoomFit** to make the  $y$ -values graph prettily <sup>2</sup> the function according to what we chose in point ①. It should display this:



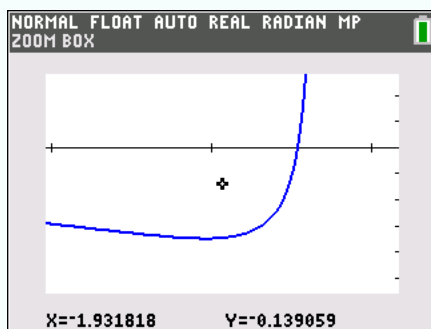
- ③ To display a specific part of the graph (here: the first local minimum), press format f3 **zoom** **Zbox**.

Use  to move to a point on the screen that you want the top left corner of the screen to be, and press entry solve **enter**.

Use again  to the future bottom right part of the screen:



Press entry solve **enter**. Here, it should display the box you framed:



<sup>2</sup>ZoomFit recalculates **Ymin** and **Ymax** to include the minimum and maximum  $y$ -values of the selected functions between the current **Xmin** and **Xmax**. **Xmin** and **Xmax** are not changed.

- ④ If you wish to zoom out in order to zoom in to another part of the graph, press **format f3** **zoom** , **Zoom Out** and **enter** .

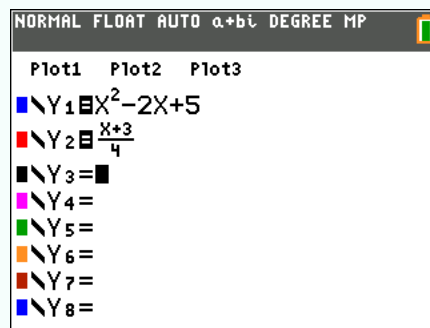
### 2.3.3 Graph the sum of functions

Suppose you want graph the sum of the following functions:

$$f(x) = x^2 - 2x + 5$$

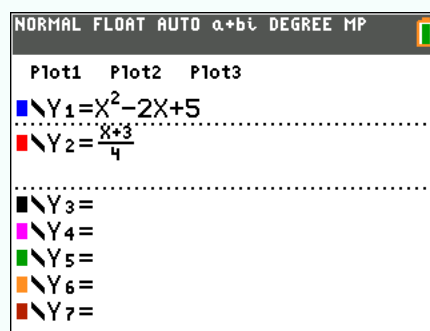
$$g(x) = \frac{x+3}{4}$$

- ① Enter the two functions using the **stat plot f1** **y=** button:

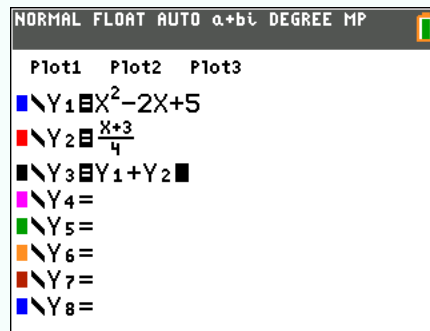


The fraction is done pressing **A-lock alpha** , **stat plot f1** **y=** and **n/d**

- ② Deactivate the graph of  $Y_1$  and  $Y_2$  by highlighting the “=” symbol on  $Y_1$  and  $Y_2$  and pressing **enter** (“**=**” means it’s activated, “**=**” means it’s deactivated):



- ③ define  $Y_3$  as  $Y_1 + Y_2$ :



To access  $Y_1$  and  $Y_2$ , press alpha and calc f4

- ④ press graph to display the graph of  $Y_3$  (see 2.3.2 to display the graph correctly)

The same goes for subtraction, multiplication or division of two functions.