

## Chapter 6 / Example 1

# Sketching a graph

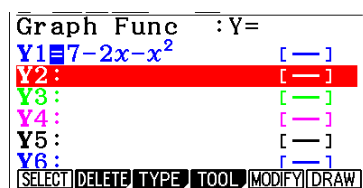
When you “**sketch**” a graph, your sketch should:

- show the general shape of the graph accurately
- label the coordinates of any axes intercepts
- label the coordinates of any vertices.

- a** Sketch the graph of the function  $f(x) = 7 - 2x - x^2$ , for  $-5 \leq x \leq 3$ , and hence determine the range.
- b** What would the range be if the domain were unrestricted?

Press **MENU** 5 **GRAPH** to display the equation entry screen.

Type  $7 - 2x - x^2$  and press **EXE** to enter the equation as Y1.

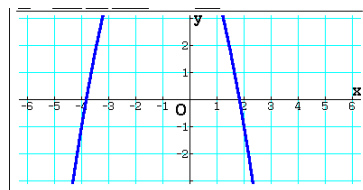


Press **F6** DRAW to display the graph screen.

The GDC now displays the quadratic function:

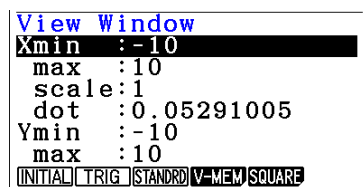
$$Y_1 = 7 - 2x - x^2$$

The default axes are  $-6.3 \leq x \leq 6.3$  and  $-3.1 \leq y \leq 3.1$ .



Press **F3** V-Window and then **F3** STANDARD to select the standard window. The standard axes are  $-10 \leq x \leq 10$  and  $-10 \leq y \leq 10$ .

Press **EXIT** when you have finished.

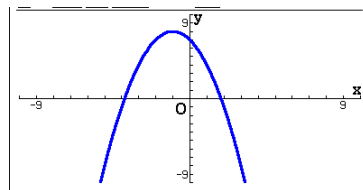


Press **F6** DRAW to display the graph screen.

The GDC now displays the quadratic function

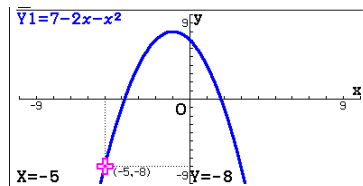
$$Y_1 = -0.5x^2 + 7.5x - 18$$

in a suitable window.



To find the endpoints in the given domain, press **F1** Trace, type  $-5$  and press **EXE**.

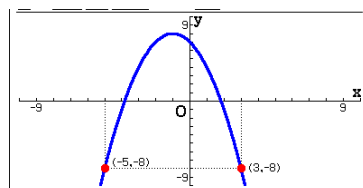
There is an endpoint at  $(-5, -8)$ .



Type 3 and press **EXE**.

There is an endpoint at  $(3, -8)$ .

Press **EXIT** to leave trace mode and press **EXE** and press **F6** DRAW to display the graph screen.



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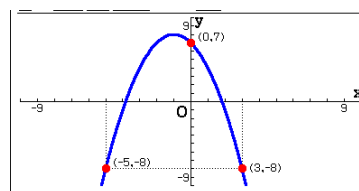
# Sketching a graph

To find the  $y$ -intercept press **F5** G-SOLVE and then press **F4** Y-ICEPT.

Press **EXE** to display the coordinates.

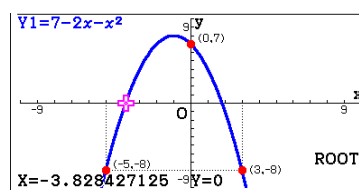
Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.

The  $y$ -intercept is at  $(0, 7)$ .



To find the  $x$ -intercepts or roots press **F5** G-SOLVE and then press **F1** ROOT.

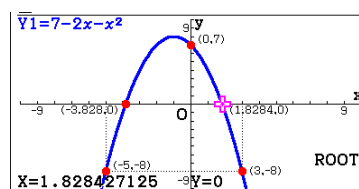
The GDC shows the first root.



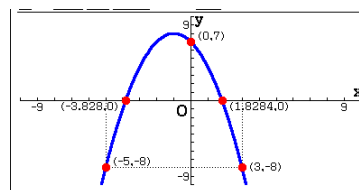
Press **EXE** to display the coordinates.

Press **▶** to move to the next root and press **EXE** to display its coordinates.

Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.



The GDC displays zeros at  $(-3.83, 0)$  and  $(1.83, 0)$ .



To find the vertex press **F5** G-SOLVE and then press **F2** MAX.

Press **EXE** to display the coordinates.

Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.

The vertex of the quadratic function is at  $(-1, 8)$ .

The range of the function is  $-8 \leq y \leq 8$ .

With unrestricted domain the range is  $y \leq 8$ .

