Chapter 3 / **Example 8**

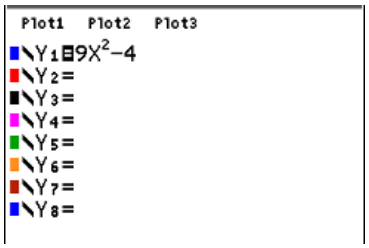
Solving inequalities

Find the values of r for which the equation $x^2 + 3rx + 1 = 0$ has
a two distinct real roots **b** one real repeated root **c** no real roots.

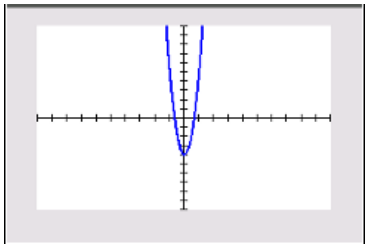
If there are two distinct roots then $9r^2 - 4 > 0$. One repeated root $9r^2 - 4 = 0$ and no real roots $9r^2 - 4 < 0$.

Press [f1] [y=] to display the equation entry screen.

Type $9x^2 - 4$ and press [enter] to enter the equation as Y_1.



The GDC displays the graph $f1(x) = 9x^2 - 4$ with the default axes.



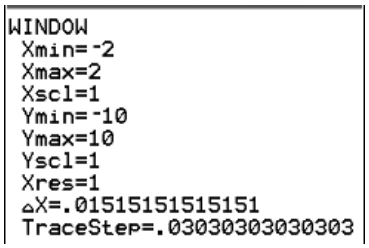
To see both zeros better, change the window settings

Press [f2] [window] [format]

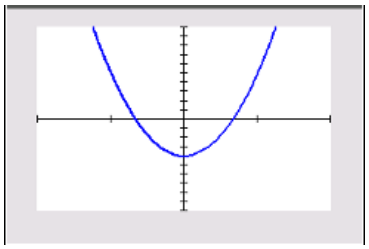
Change the settings to $-2 \le x \le 2$.

Leave everything else the same.

Press [f5] [graph] when you have finished.



The GDC displays the graph in a suitable window.

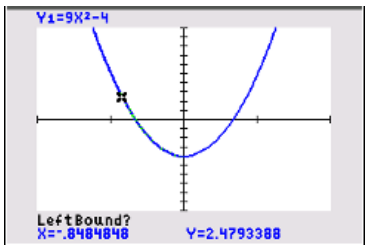


To find the zeros press [2nd] [f4] [calc] 2:zero

You will need to give the left and right bounds of the region that includes the zero.

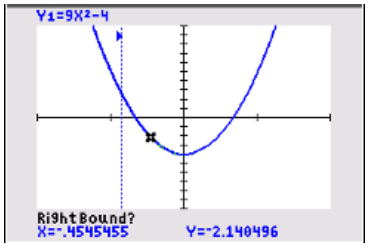
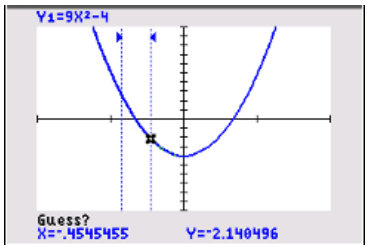
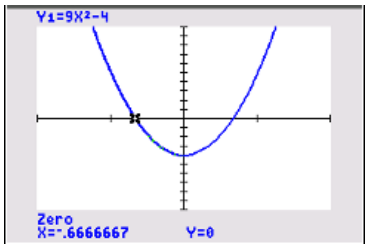
The GDC shows a point on the curve and asks you to set the left bound. Move the point using [▶] [◀] and choose a position to the left of the zero.

Press [enter].



Chapter 3 / **Example 8**

Solving inequalities

The GDC shows a line where you have set the left bound and a point on the curve. Move the point using ▶ ◀ and choose a position to the right of the zero. When the region contains the zero, Press enter.	
The GDC requires an initial guess for the position of the zero. Choose the default position. Press enter.	
The GDC displays a zero at $(-0.667, 0)$.	
Repeat for the second zero. The GDC displays a zero at $(0.667, 0)$. There are two distinct roots when $r < -0.667$ or $r > 0.667$, one repeated root when $r = -0.667$ or $r = 0.667$ and no real roots when $-0.667 < r < 0.667$.