

Chapter 5 / Example 1

Limit of a function

Use your GDC to help you answer parts a and b.

a Sketch the graph of $y = \frac{x^2 - 9}{x - 3}$, $x \neq 3$

b Find $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$ numerically.

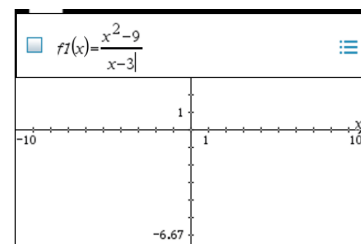
Open a new document and add a Graphs page.

The entry line is displayed at the top of the work area.

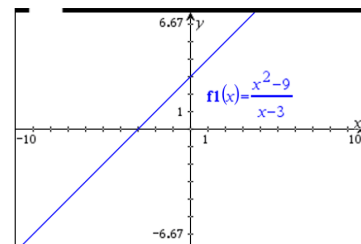
The default graph type is function, so 'f1(x)=' is displayed.

The default axes are $-10 \leq x \leq 10$ and $-6.67 \leq y \leq 6.67$.

Type $\frac{x^2 - 9}{x - 3}$, using $\boxed{\text{ctrl}}$ $\boxed{\div}$ $\boxed{\left(\frac{\square}{\square} \right)}$ to enter the rational function, and press $\boxed{\text{enter}}$.



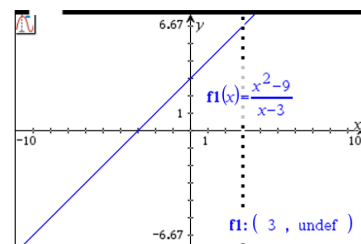
The GDC displays $y = \frac{x^2 - 9}{x - 3}$ in the default window.



Press $\boxed{\text{menu}}$ 5:Trace | 1:Graph Trace

Use \blacktriangleright move along the line towards the point where $x = 3$

The GDC displays 'f1:(3 , undef)' since the rational function is not defined at $x = 3$.

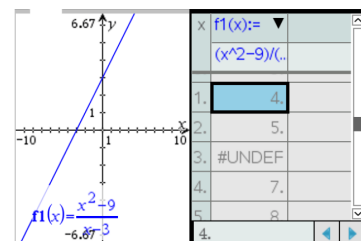


Press $\boxed{\text{esc}}$ to exit Graph Trace mode.

To see the behavior around the point where $x = 3$ it is helpful to use a table of values. Press $\boxed{\text{ctrl}}$ $\boxed{\text{T}}$.

A table of values is displayed alongside the graph.

The table shows '#UNDEF' by $x = 3$.

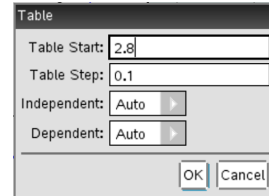


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Press **menu** 2:Table | 5: Table Settings...

Edit the table settings so that the table starts at 2.8 with steps of 0.1.



Table

Table Start: 2.8

Table Step: 0.1

Independent: Auto

Dependent: Auto

OK Cancel

Hint: use the **tab** key to move between the settings.

From the table of values, since the limits from both the left and right are the same to the nearest whole number, $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} = 6$.

