

Chapter 5 / Example 1

Limit of a function

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

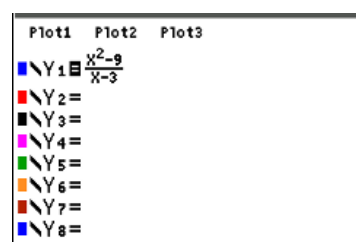
a Sketch the graph of $y = \frac{x^2 - 9}{x - 3}$, $x \neq 3$

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

Press $[F1][Y=]$ to display the equation entry screen.

Press $[ALPHA][F1]$ 1:n/d to select the fraction template

Type $\frac{x^2 - 9}{x - 3}$ in the template and press $[ENTER]$ to enter the equation as Y_1 .

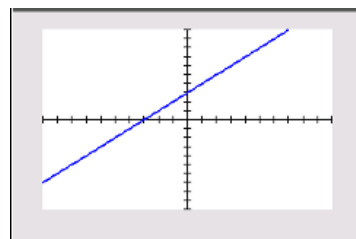


Press $[F5][GRAPH]$ to display the graph screen

The GDC now displays the function:

$$Y_1 = \frac{x^2 - 9}{x - 3}$$

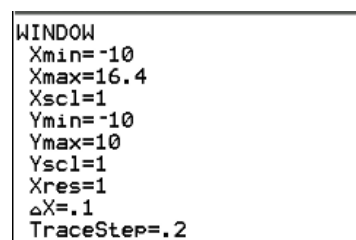
The default axes are $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.



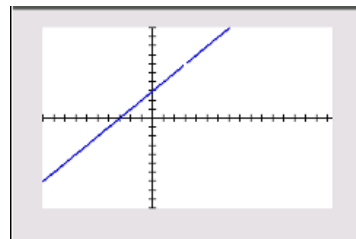
Press $[F2][WINDOW]$ and change the value of TraceStep to 0.2 and press $[ENTER]$.

The values of ΔX and X_{max} change automatically.

Press $[F5][GRAPH]$.



If you look closely at the line, you will notice that the change in the window has revealed that there is a gap in the line.



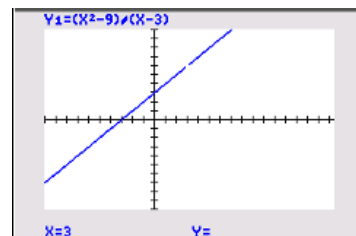
Chapter 5 / Example 1

Limit of a function

Press **[trace]**

Use **▶** move along the line towards the point where $x = 3$

The GDC shows values of x and y as you move along the line but when $x = 3$ there is no value of y shown. This is because the rational function is not defined at $x = 3$.

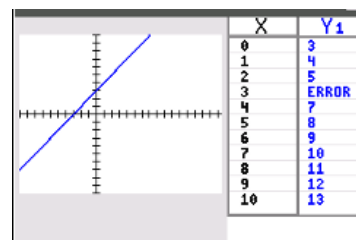


To see the behavior around the point where $x = 3$ it is helpful to use a table of values.

Press **[mode]**. Use the **◀ ▶ ▲ ▼** keys to place the cursor on GRAPH-TABLE in the Mode menu, and then press **[enter]** to highlight it. Press **[f5]** **[graph]**.

A table of values is displayed alongside the graph.

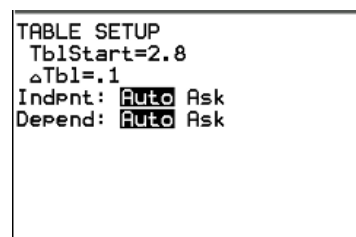
The table shows 'ERROR' by $x = 3$.



Press **[2nd]** **[f2]** **[tblset]**

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

Press **[f5]** **[graph]**.



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

