

## Chapter 4 / Example 3

# Asymptotes

An alternative GDC approach to finding asymptotes of rational functions

- Sketch the function  $y = \frac{1}{x-2}$ . Show any asymptotes, not on the axes, as dotted lines.
- Write down the equations of the horizontal and vertical asymptotes.
- State the domain and range.

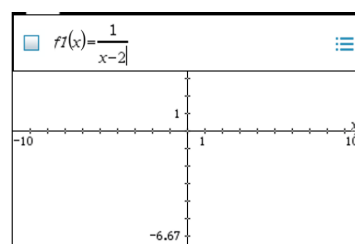
Open a new document and add a Graphs page.

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

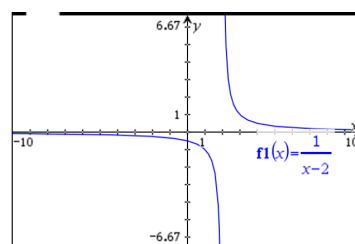
The default graph type is function, so 'f1(x)=' is displayed.

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

Type  $\frac{1}{x-2}$ , using  $\boxed{\text{ctrl}} \boxed{\div} (\boxed{\frac{\square}{\square}})$  to enter the rational function, and press  $\boxed{\text{enter}}$ .



The GDC displays  $y = \frac{1}{x-2}$  in the default window.

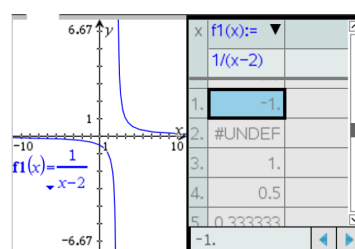


To view asymptotic behavior, it is helpful to use a table of values. Press  $\boxed{\text{ctrl}} \boxed{\text{T}}$ .

A table of values is displayed alongside the graph.

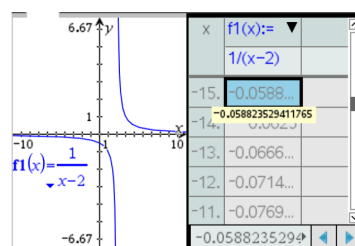
The table shows '#UNDEF' by  $x = 2$ .

This shows that  $x = 2$  is a vertical asymptote.



Scroll up the table using  $\blacktriangle$  on the touchpad.

The values of  $f1(x)$  are negative and approaching 0



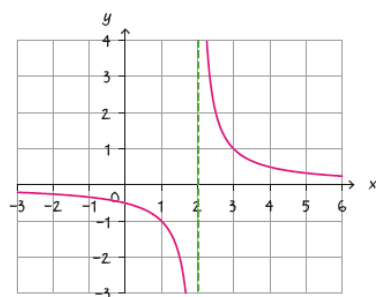
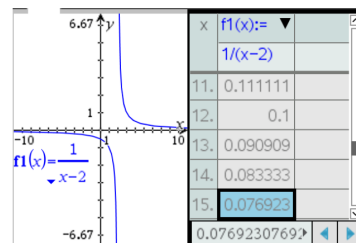
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# Asymptotes

Scroll down the table using ▼ on the touchpad.

The values of  $f1(x)$  are positive and approaching 0.

You can conclude that  $x = 0$  is a horizontal asymptote.



Domain:  $x \in \mathbb{R}, x \neq 2$

Range:  $y \in \mathbb{R}, y \neq 0$