

Chapter 2 / **Example 7****Domain, range and asymptotes**

Use of a table to assist in identifying asymptotes to find the domain and range of a function.

Determine the domain and range of the rational function  $y = \frac{2}{1-x}$ .

Confirm your answer graphically, and state the equations of any asymptotes.

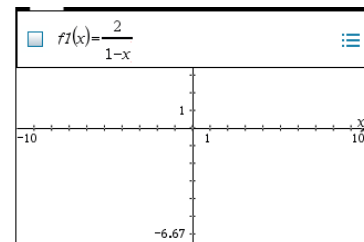
Open a new document and add a Graphs page.

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

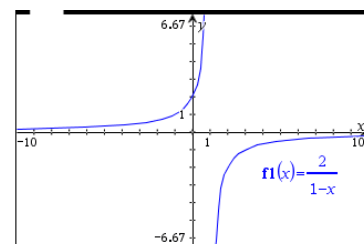
The default graph type is function, so 'f1(x)= ' is displayed.

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

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



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

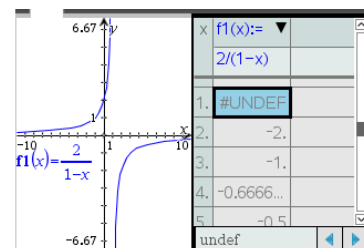


To view asymptotic behavior, it is helpful to use a table of values. Press  $\boxed{\text{ctrl}}$   $\boxed{\text{T}}$ .

A table of values is displayed alongside the graph.

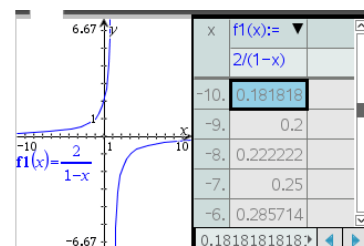
The table shows '#UNDEF' by  $x = 1$ .

This shows that  $x = 1$  is a vertical asymptote.



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

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

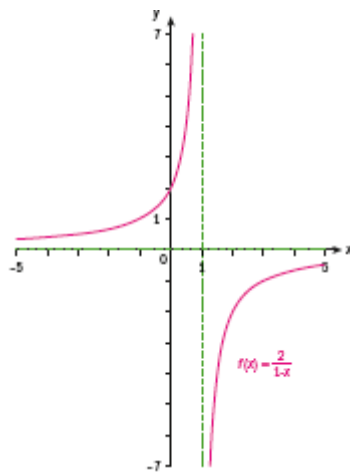
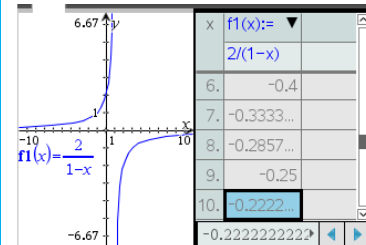


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Scroll down the table using ▼ on the touchpad.

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

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



Domain:  $x \in \mathbb{R}, x \neq 1$

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