

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.

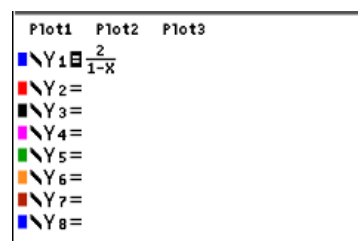
Determine the domain and range of the rational function $y = \frac{2}{1-x}$.

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

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

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

Type $\frac{2}{1-x}$ and press $[enter]$ to enter the equation as Y_1 .

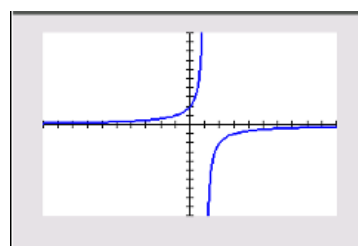


Press $[F5]$ $[graph]$ to display the graph screen

The GDC now displays the quadratic function:

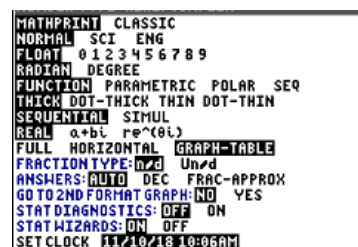
$$Y_1 = \frac{2}{1-x}$$

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



To view asymptotic behavior, it is helpful to use a table of values.

Press $[mode]$. Use the \leftarrow \uparrow \rightarrow \downarrow keys to place the cursor on GRAPH-TABLE in the Mode menu, and then press $[enter]$ to highlight it.



Press $[F5]$ $[graph]$.

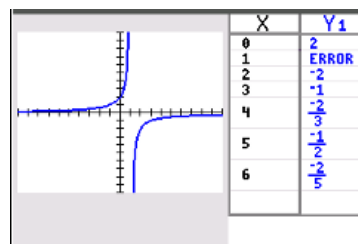
A table of values is displayed alongside the graph.

Press $[2nd]$ $[F5]$ $[table]$ to move the cursor into the table.

You can scroll through the table using \uparrow and \downarrow on the touchpad.

The table shows 'ERROR' by $x = 1$.

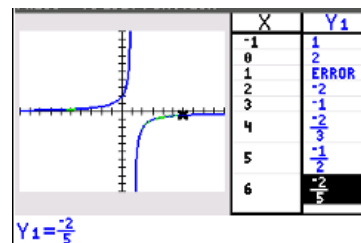
This shows that $x = 1$ is a vertical asymptote.



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

Scroll up the table using \blacktriangle .

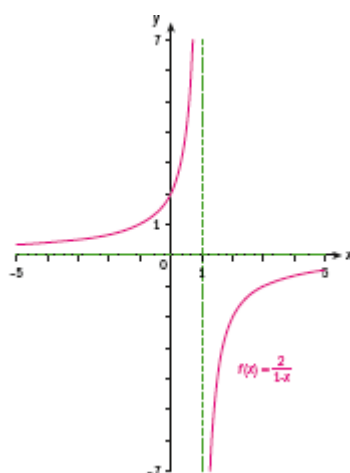
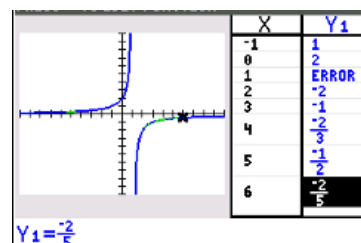
The values of Y_1 are negative and approaching 0.



Scroll down the table using \blacktriangledown .

The values of Y_1 are positive and approaching 0.

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



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

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