

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 **MENU** 5 **GRAPH** to display the equation entry screen.

Press **F6** to open the fraction template.

Type $\frac{2}{1-x}$ and press **EXE** to enter the equation as Y1.

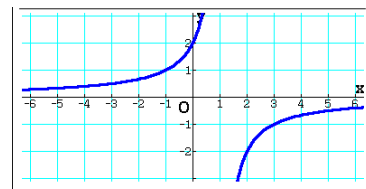
Graph Func : Y=
Y1 = $\frac{2}{1-x}$ [—]
Y2: [—]
Y3: [—]
Y4: [—]
Y5: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

Press **F6** DRAW to display the graph screen

The GDC now displays the quadratic function:

$$Y1 = \frac{2}{1-x}$$

The default axes are $-6.3 \leq x \leq 6.3$ and $-3.1 \leq y \leq 3.1$.



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

Press **MENU** 7 **TABLE**. Press **F5** SET and change the settings so that the table starts from -6 and ends at 6.

Press **EXIT**.

Table Setting
X
Start: -6
End : 6
Step : 1

Press **F6** TABLE.

A table of values is displayed.

You can scroll through the table using **▲** and **▼**.

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

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

Y1 = $2 \div (1-x)$
x y1
-1 1
0 2
1 ERROR
2 -2
ERROR
[FORMULA] [DELETE] [ROW] [EDIT] [GPH-CON] [GPH-PLT]

Scroll up the table using **▲**.

The values of Y1 are negative and approaching 0.

Y1 = $2 \div (1-x)$
x y1
-6 0.2857
-5 0.3333
-4 0.4
-3 0.5
2.7
[FORMULA] [DELETE] [ROW] [EDIT] [GPH-CON] [GPH-PLT]

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

Scroll down the table using \blacktriangledown .

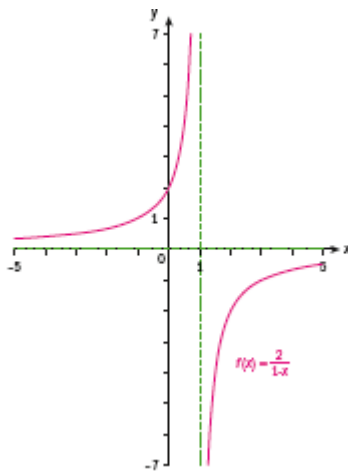
The values of Y1 are positive and approaching 0.

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

$Y1=2 \div (1-x)$	
X	Y1
3	-1
4	-0.666
5	-0.5
6	-0.4

-2 5

FORMULA DELETE ROW EDIT GRAPH-CON GRAPH-PLT



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

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