

Chapter 2 / **Example 11****Domain, range and asymptotes**

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

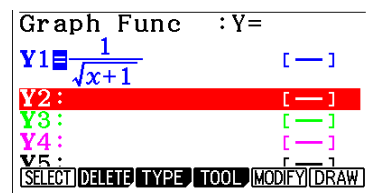
Determine the domain and range of the rational function $y = \frac{1}{\sqrt{x+1}}$.

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

Press **MENU** 5 **EXE** to display the equation entry screen.

Press **□** to open the fraction template

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

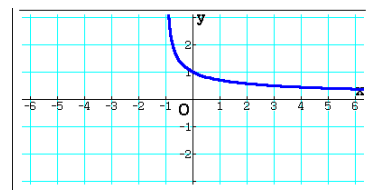


Press **F6** DRAW to display the graph screen

The GDC now displays the quadratic function:

$$Y1 = \frac{1}{\sqrt{x+1}}$$

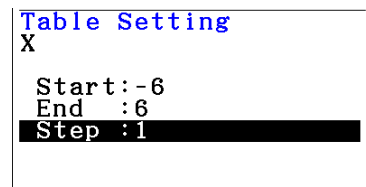
The default axes are $-6.3 \leq x \leq 6.3$ and $-3.1 \leq y \leq 3.1$.



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**.



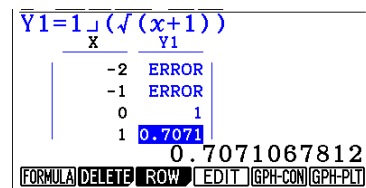
Press **F6** TABLE.

A table of values is displayed.

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

The table shows 'ERROR' by $x \leq -1$.

This suggests that $x = -1$ is a vertical asymptote.

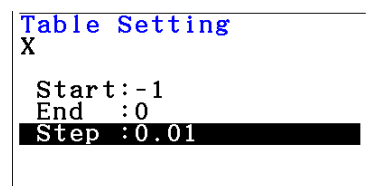


To view behavior around the vertical asymptote, change the table view.

Press **EXIT** and press **F5** SET.

Set the table to start at -1 and end at 0 with a step of 0.01.

Press **EXIT** and press **F6** TABLE.



Chapter 2 / **Example 11****Domain, range and asymptotes**

The values of Y1 are increasing as x approaches -1 , confirming that $x = -1$ is a vertical asymptote.

X	Y1
-1	ERROR
-0.99	10
-0.98	7.071
-0.97	5.7735

-1

FORMULA DELETE ROW EDIT GPH-CON GPH-PLT

Press **EXIT** and press **F5** SET.

Set the table to end at 10 and the step to 1.

Press **EXIT** and press **F6** TABLE.

Table Setting

X

Start: -1

End : 10

Step : 1

Scroll down the table using **▼**.

The values of Y1 are positive and approaching 0.

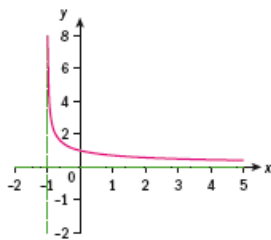
You can conclude that $y = 0$ is a horizontal asymptote.

Y1=1/(x+1)

X	Y1
7	0.3535
8	0.3333
9	0.3162
10	0.3015

0.3015113446

FORMULA DELETE ROW EDIT GPH-CON GPH-PLT



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

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