

Chapter 4 / Example 3

Asymptotes

An alternative GDC approach to finding asymptotes of rational functions

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

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

Press **□** to open the fraction template

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

Graph Func : Y=

Y1: $\frac{1}{x-2}$ [—]

Y2: [—]

Y3: [—]

Y4: [—]

Y5: [—]

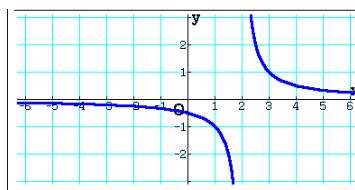
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

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

The GDC now displays the quadratic function:

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

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 $x = 2$.

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

X	Y1
1	-1
2	ERROR
3	1
4	0.5

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Scroll up the table using **▲**.

The values of Y1 are negative and approaching 0.

X	Y1
-6	-0.125
-5	-0.142
-4	-0.166
-3	-0.2

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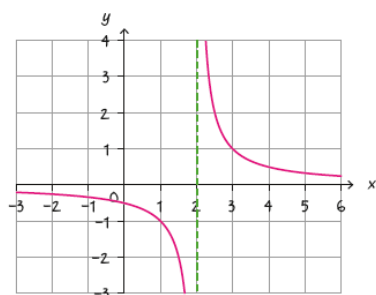
Chapter 4 / Example 3

Asymptotes

Scroll down the table using \blacktriangledown .

The values of Y1 are positive and approaching 0.

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



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

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

X	Y1
3	1
4	0.5
5	0.3333
6	0.25

6

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