

# **YEAR 11 MATHEMATICS**

## **EXTENSION 1 FUNCTIONS**

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# **Chapter 1. Further Work with Functions**

## 1.1 Graphical Relationship

The relationship between the graph of  $y = f(x)$  and the graph of  $y = \frac{1}{f(x)}$

**Step 1.** Draw the vertical asymptote at which  $f(x) = 0$

**Step 2.** Draw the new horizontal and oblique asymptotes if exist

**Step 3.**

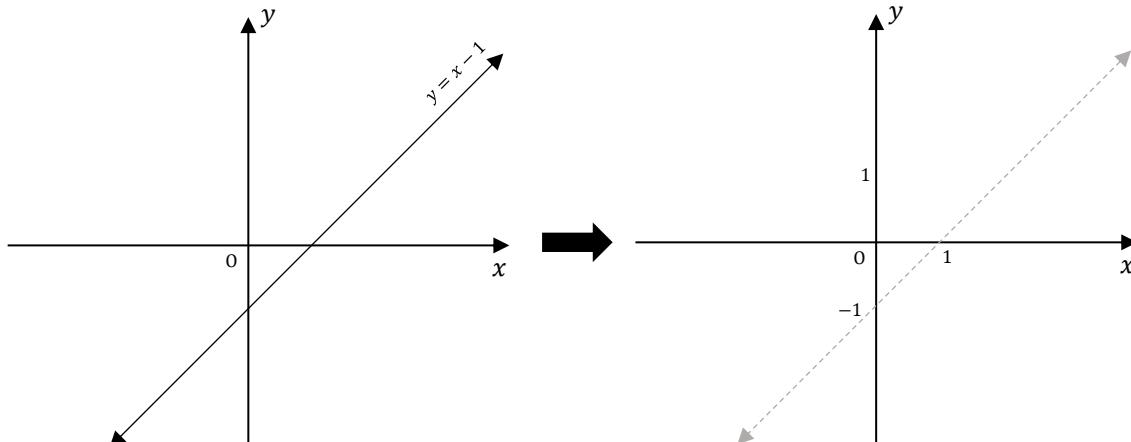
- If the equation of the function is not given, draw an open circle at which the existing vertical asymptotes cut the  $x$  axis
- If the equation of the function is given, draw a closed circle at which the existing vertical asymptotes cut the  $x$  axis.

**Step4.** Mark the points at which  $f(x) = \pm 1$

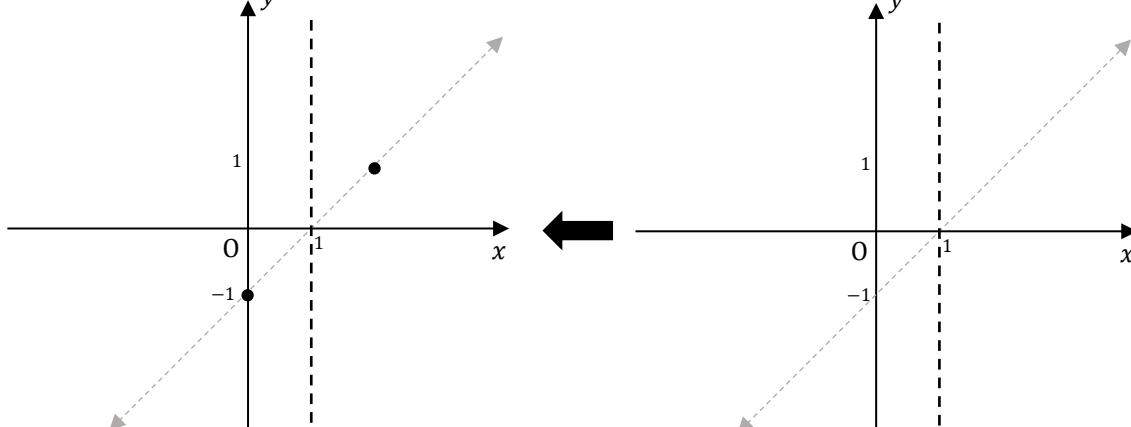
**Step5.** Apply the characteristics

$$\frac{1}{f(x)} \rightarrow 0 \text{ as } f(x) \rightarrow \infty \quad \& \quad \frac{1}{f(x)} \rightarrow \infty \text{ as } f(x) \rightarrow 0$$

**Example:** If  $y = x - 1$ , sketch the graph of  $y = \frac{1}{x-1}$



**Step 1.** Draw a vertical asymptote at  $f(x) = 0$



**Step 5.** Apply the characteristics

**Step 4.** Mark the points at which

$$f(x) = \pm 1$$