HSC COLLEGE
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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.

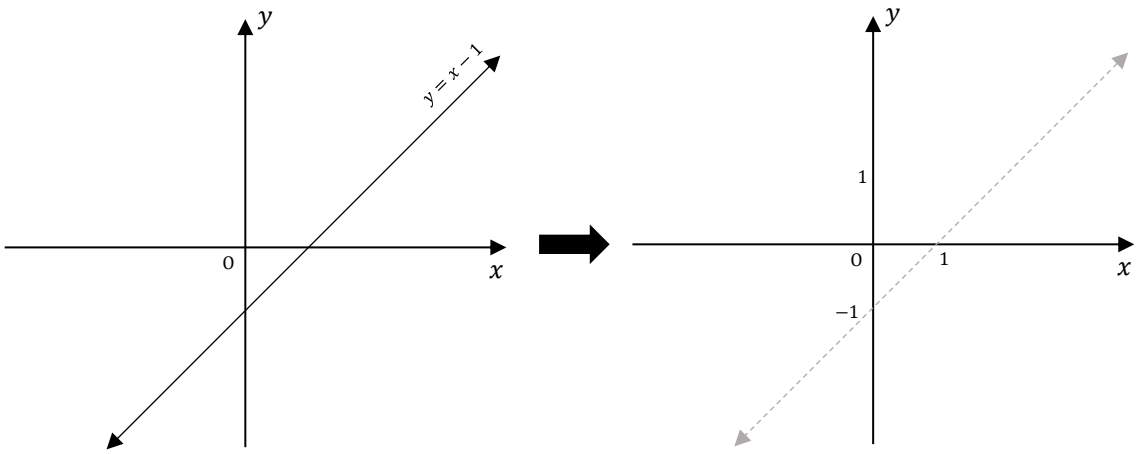
- If the equation of the function is not given, draw an open circle at which the existing vertical asymptotes cut the x axis
- If the equation of the function is given, draw a closed circle at which the existing vertical asymptotes cut the x axis.

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

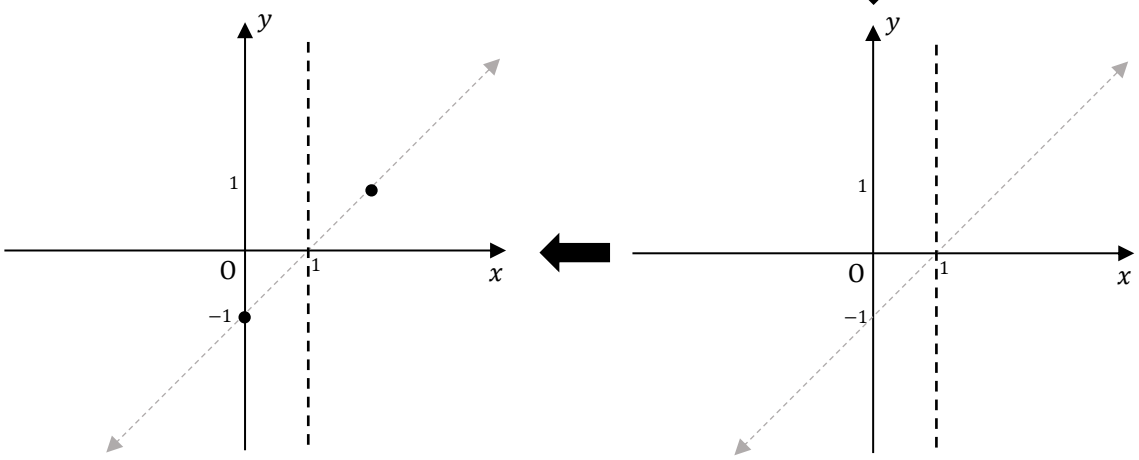
Step5. Apply the characteristics

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

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

$f(x) = \pm 1$