

# Unit #3: Rational Functions

## Lesson #1: Reciprocal of a Linear Function

Example #1:

a) Sketch the graph of  $y = x + 2$

b) For the graph of:  $y = \frac{1}{x+2}$

State:

i) any restrictions:

$$x \neq -2 \quad y \neq 0$$

ii) the intercepts

There are no x-intercepts

The y-intercept is at  $y = 0.5$

iii) the domain and range:

$$D = \{x \in \mathbb{R}, x \neq -2\}$$

$$R = \{y \in \mathbb{R}, y \neq 0\}$$

iv) the end behaviour

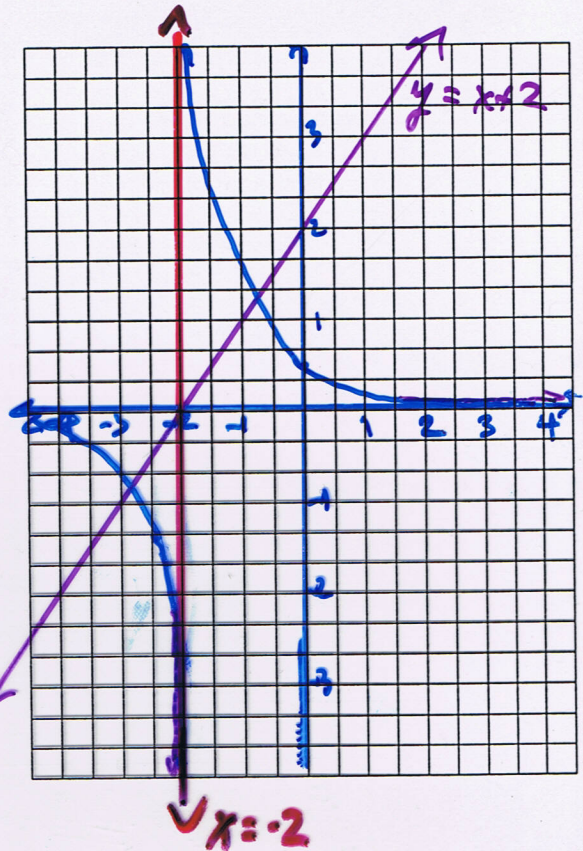
$$x \rightarrow \infty, y \rightarrow 0$$

$$x \rightarrow -\infty, y \rightarrow 0$$

$$y \rightarrow \infty, x \rightarrow -2$$

$$y \rightarrow -\infty, x \rightarrow -2$$

v) Sketch the function:  $y = \frac{1}{x+2}$



← GET DEF<sup>n</sup> from TEXT BOOK

Asymptotes: A line that a curve approaches but never intersects  
Vertical asymptotes are determined by the x-value that forces the denominator to be zero. (cannot divide by 0)  
Horizontal asymptotes are determined by a separate value that is isolated from the division by a set of brackets. With no separate value it is at  $y = 0$ .