**PMATH 12 – CHAPTER 2 – ABSOLUTE VALUE AND RECIPROCAL FUNCTIONS**

**2.2 Graphing Reciprocals of Linear Functions**

A reciprocal function y = $\frac{1}{f(x)}$ , f(x) $\ne 0$

eg. f(x) = $\frac{1}{x-2}$ y = $\frac{x}{x-3}$

The graphs of reciprocal functions (aka rational functions) are not continuous curves. Since the denominator cannot include zeros, the domain will not include these values.

A line that a curve approaches closely but never touches, is called an **asymptote**. They can be horizontal, vertical or oblique.

**Ex.1** f(x) = $\frac{1}{x-2}$

* From the denominator x-2$\ne 0$ then x $\ne 2$ This is a vertical asymptote at x=2
* Also $\frac{1}{x-2}$ $\ne 0 $ So, y$\ne 0$ means it is a horizontal asymptote at y=0

Use the graphing calc - \*IMPORTANT\* - when entering equation **y1 = 1/(x-2)** bracket!!

\*IMPORTANT\* - the graph may appear to have a line where the asymptote is but that is because of the pixels and small screen size, you shouldn’t get these when using DESMOS

Domain

Range

**Ex 2** Sketch a graph of y = $\frac{1}{x-3}$ using the graph of y = x - 3

**First**, y = x – 3 slope 1, y-int -3

**Second**, y = $\frac{1}{x-3}$ vert. asy. x = 3 (use dashed line)

 hor. asy. y = 0

Using y = x – 3 a couple of points (4, 1), (2, -1)

Happen to be the same for y = $\frac{1}{x-3}$

**Third**, choose some points on either side of the vert.asy.

|  |  |  |
| --- | --- | --- |
| x | y = x – 3 | y = $\frac{1}{x-3}$  |
| 1 |  |  |
| 2 |  |  |
| 5 |  |  |

Domain

Range

**Homework – p98 #3-7 and multiple choice**