PENANG SANGAM HIGH SCHOOL
P.O.BOX 44, RAKIRAKI
LESSON NOTES

School: Penang Sangam High School **Year/Level:** 13 **Subject:** Mathematics

Strand	**3 FUNCTIONS**
Sub Strand	**3.2 Graphs of Functions**
Content Learning Outcome	The students should be able to; - draw graphs of polynomials - draw graphs of rational functions

Lesson Notes (week 9)

Good day to u all. The next type of rational function that we are going to study is the ***Balanced Functions****.*

Balanced Functions

Lesson Objectives

At the end of the lesson the students should be able to;

- find x and y intercepts.

- Find vertical and horizontal asymptotes.

- sketch the graph.

Notes:

- The numerator and the denominator has the same degree.

$f(x)=\frac{ax^n+.....}{bx^n+...}$ where $a, b \neq 0$,

- then horizontal asymptote has equation $y = \frac{a}{b}$

Steps to sketch the graph;

- find the x-intercept (numerator = 0)

- find y-intercept (x = 0)

- find the vertical asymptote (denominator = 0)

- find the horizontal asymptote (ratio of coefficient of x)

- Sketch

Example: Sketch $\boldsymbol{f(x) = \frac{x^2+x-2}{x^2-2x-3}}$

$\mathbf{x^2 + x - 2}$ $\mathbf{x^2 - 2x - 3}$ $\mathbf{f(x) = \frac{(x+2)(x-1)}{(x-3)(x+1)}}$

$= (x + 2)(x - 1)$ $= (x - 3)(x + 1)$

x – int (N = 0) y int (x = 0)

$\mathbf{x^2 + x - 2} = 0$ $\quad$ $\mathbf{y} = \frac{\mathbf{0^2+0-2}}{\mathbf{0^2-2(0)-3}}$

$(x + 2)(x - 1) = 0$ $\quad$ $= \frac{2}{3}$ $\quad$ $(0, \frac{2}{3})$

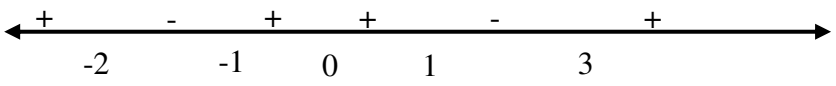
$x = -2$ $(-2, 0)$ $\quad$ $x = 1$ $(1, 0)$

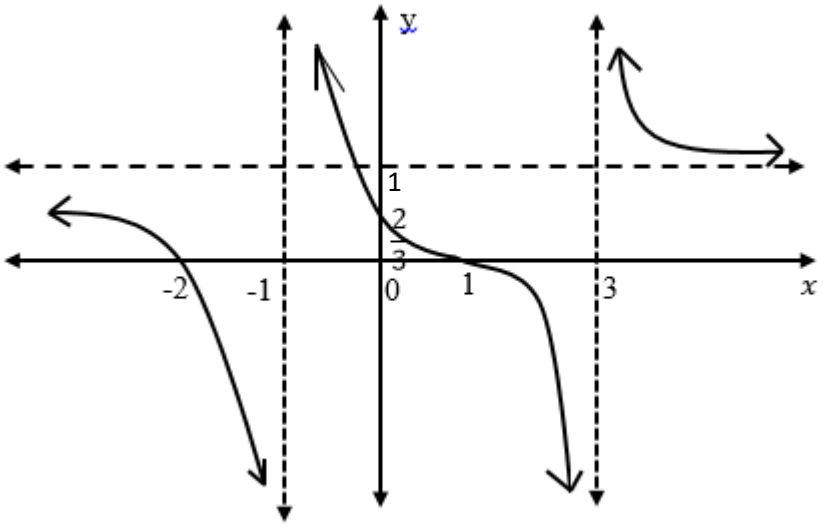
VA (let den = 0) $\quad$ HA (coefficient of x)

$(x - 3)(x + 1)=0$ $\quad$ $y = 1$

$x = 3$ $\quad$ $x = -1$

Take the numbers in between and substitute in place of x to find whether the graph is above the x-axis or below the x-axis.





Exercise:

Sketch the following graphs.

For the following functions;

a) Find x and y intercept

b) identify asymptotes and give their equations

c) sketch the graph, clearly showing the intercepts and the asymptotes.

1. $g(x) = \frac{(x+1)(3-2x)}{(x-1)(x+2)}$ $\quad$ 2. $f(x) = \frac{(x+1)(x+4)}{(x-2)(x+2)}$