TAVUA COLLEGE
Email: tavuacollege.3056@gmail.com **PHONE:** 6680244 / 9369480

WEEKLY HOME STUDY PACKAGE – WEEK 2 (12/07/21 – 16/07/21)

Subject	**MATHEMATICS**	**YEAR/LEVEL**	**13**
Strand	3 – FUNCTIONS		
Sub – Strand	13.3.2 GRAPHS OF FUNCTIONS		
Content Learning Outcome	Sketch and interpret graphs of rational functions		

LESSON NOTE:

Graphs of Rational Functions (Bottom Heavy Function)

Objective: To draw graphs of rational functions (bottom heavy function).

When a denominator of a rational function has higher degree than numerator it is called a **bottom heavy function.** To sketch its graph, follow the following steps:

1. Find x intercept by equating the numerator to 0. Write the answer as coordinates.
2. Find y intercept by letting $x = 0$ .Write the answer as coordinates.
3. Find **vertical asymptote** by equation the denominator to 0. Write the answer equations: eg. $x = 2$.
4. The **horizontal asymptote** for a bottom heavy function is always $y = 0$.
5. Use a **number line** to represent all the x – values in ascending order to determine the behavior of the graph. Sketch the graph. (All asymptotes should be a dotted line and x and y intercepts should be properly plotted).

Example: A rational function is given as $f(x) = \frac{x+3}{(x-3)(x+2)}$.

(a) Find the x and y intercepts of the graph of $f(x)$.

x intercept

let *numerator* = 0 :

$x + 3 = 0$

$x = -3$

x- intercept = $(-3, 0)$

y intercept: let $x = 0$:

$$f(0) = \frac{(0+3)}{(0-3)(0+2)} = -\frac{1}{2}$$

y-intercept = $(0, -0.5)$

(b) Identify the asymptote(s) and find their equations.

vertical asymptote

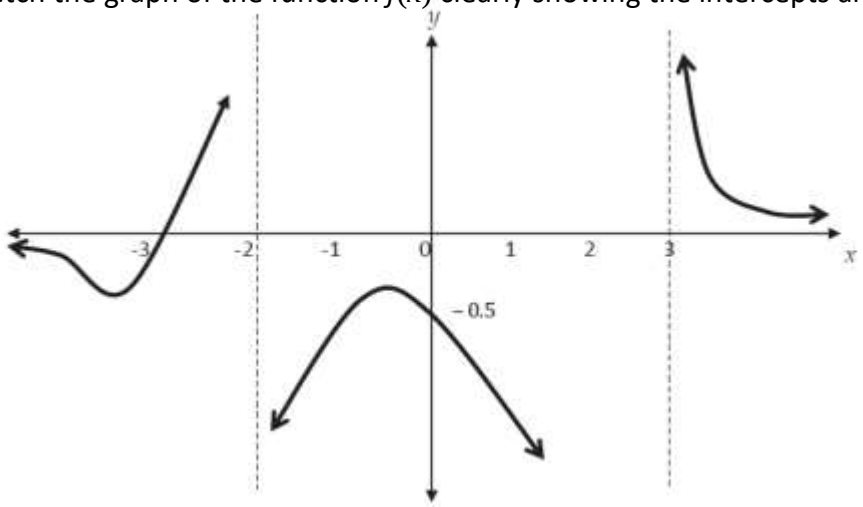
let *denominator* = 0 :

$x - 3 = 0$ and $x + 2 = 0$

$x = 3$ and $x = -2$ are the equations

Since it's a **bottom heavy function**, the horizontal asymptote is $y = 0$

(c) Sketch the graph of the function $f(x)$ clearly showing the intercepts and asymptotes.



Exercise:

A rational function is given by $f(x) = \frac{(x-6)}{(x-2)(x+3)}$.

(a) Find the *x* and *y* **intercepts** of $f(x)$. **(1 mark)**

(b) State the equations of the **asymptotes** of $f(x)$. **(1½ marks)**

(c) Hence, sketch the **graph** of the function $f(x)$. **(3½ marks)**