3055 BA SANGAM COLLEGE

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School: Ba Sangam College   **Year / Level: 12**
Subject: Mathematics   **Name of Student: _____**

Strand	3 – Graphs
Sub strand	3.1 – Graphs and Intersections
Content Learning Outcome	➢ Studying and interpreting graphs

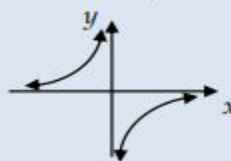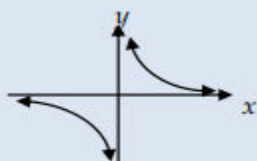**Hyperbolic Graphs**   **(Ref: Year 12 Mathematics Pg 101 – 103)**

Note: Hyperbola will have a **basic form** of $xy = c$, where c is a constant number.
Making y the subject yields: $y = \frac{c}{x}$

if c is positive(draw in quadrants 1 and 3)   if c is negative(draw in quadrants 2 and 4)

- For the **general form** $y = \frac{ax+b}{cx+d}$, important feature to note is the **asymptotes**.
  Asymptotes are those lines that you will never cross. In the above diagrams, the vertical asymptote is at y = 0 while the horizontal asymptote is at $x = 0$.
- To find the **vertical asymptote**: since denominator of rational function cannot be zero,
  let $Denominator = 0$,   i.e. $cx + d = 0$ and Solve
- To find the **horizontal asymptote**: Divide the coefficients of the variable x,
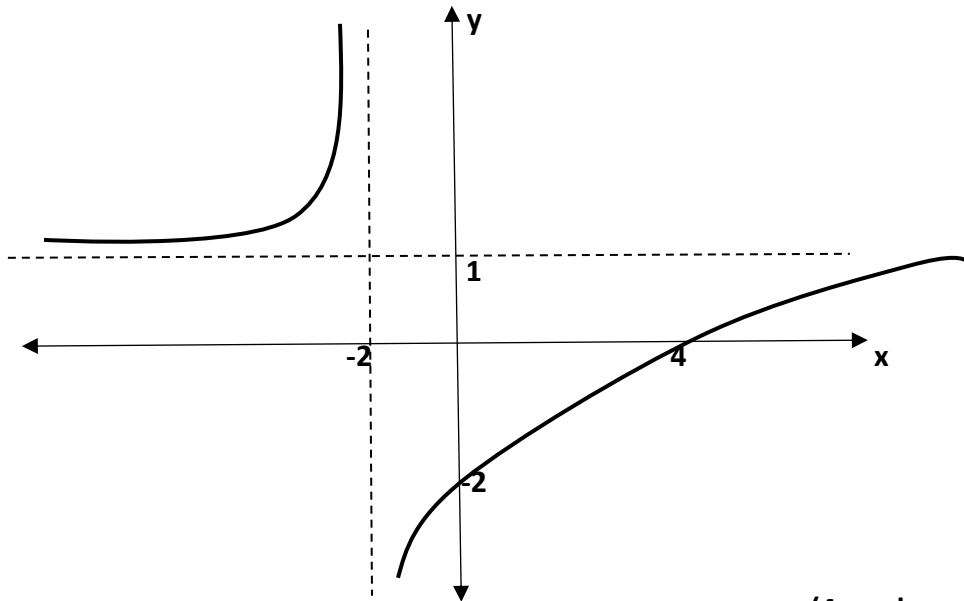 i.e. $y = \frac{ax}{cx}$ or $\frac{a}{c}$
- To sketch the graph, find the **intercepts**.
If the equation is **not in general form**, recall algebra i.e. **make denominator the same**.
  - All hyperbolas have two distinct **branches, directly opposite each other**.
  - The branches of hyperbolas get very close to particular lines called the **asymptotes**, without ever actually touching it.

Example: 1   Sketch $y = \frac{x-4}{x+2}$

x int – let y = 0	y int – let x = 0	Vertical asymptote	Horizontal asymptote
$0 = \frac{x-4}{x+2}$ $0(x+2) = x-4$ $0 = x-4$ $x = 4$ $x\ int = (4,0)$	$y = \frac{0-4}{0+2}$ $y = \frac{-4}{2}$ $y = -2$ $y\ int = (0,-2)$	**VA – denominator = 0** $x + 2 = 0$ $x = -2$	$y = \frac{a}{c}$ $y = \frac{1}{1}$ $y = 1$

ACTIVITY (4 marks each)

1. Sketch the following graphs:	
a. $y = \dfrac{4x+2}{x-3}$	**b.** $y = 1 - \dfrac{2}{x-3}$

2.

The graph of the function $y = f(x)$ is shown below. Use it to answer the questions that follow.

$y = f(x)$
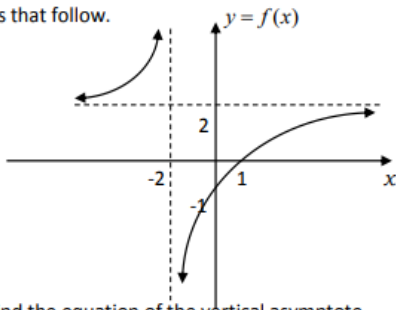
a) Find the equation of the vertical asymptote
b) State the equation of the horizontal asymptote
c) Determine the equation of the function $y = f(x)$. Express in the
   form $y = \dfrac{ax+b}{cx+d}$