

## 2.7 Graphing Rational Functions (Part 2)

Let  $R(x) = \frac{N(x)}{D(x)}$  be a rational function.

Basic steps in drawing the graph of  $y = R(x)$ .

- 1) Simplify (factor and cancel, if possible)
- 2) Find the y-intercept. [evaluate  $R(0)$ ]
- 3) Find the x-intercepts. [Solve:  $R(x) = 0 \Rightarrow N(x) = 0$ ]
- 4) Find any VAs ( $x = a$ ) [Solve:  $D(x) = 0$ ]
- 5) Find any HAs ( $y = b$ ) [Compare degrees of  $N(x)$  and  $D(x)$ ]
- 6) Use a Graphing Calculator to complete the graph.

Ex. ① Sketch the graph of:

$$f(x) = \frac{2x^2 - x - 6}{x^2 - x - 6}$$

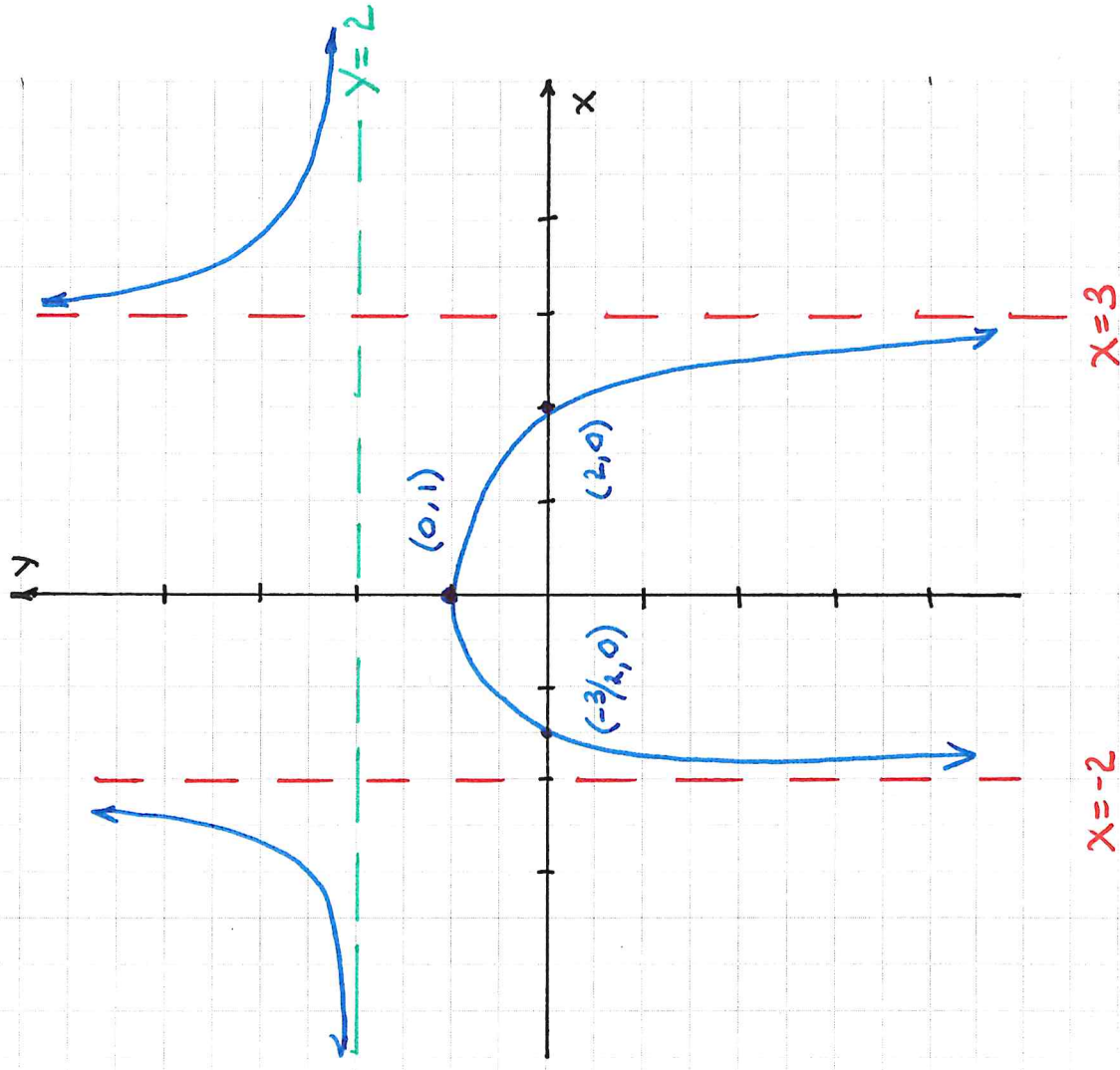
$$1) f(x) = \frac{(2x+3)(x-2)}{(x+2)(x-3)}$$

$$2) f(0) = \frac{-6}{-6} = 1 \Rightarrow (0,1)$$

$$3) \text{ Solve: } (2x+3)(x-2) = 0 \\ \Rightarrow x = -3/2 \text{ OR } x = 2$$

$$4) \text{ Solve: } (x+2)(x-3) = 0 \\ \Rightarrow \text{VA: } x = -2 \text{ OR } x = 3$$

$$5) \text{ HA: } y = \frac{2}{1} = 2 \\ \text{(same degree)}$$



Ex. ② Sketch:  $g(x) = \frac{4x^2}{x^3 - 4x^2 + 4x}$

1)  $g(x) = \frac{4x^2}{x(x^2 - 4x + 4)} = \frac{4x^2}{x(x-2)(x-2)}$

2)  $g(0) = \frac{0}{0}$  Undefined  
No y-intercept

3) Solve:  $4x^2 = 0 \Rightarrow x = 0$   
No x-intercept

4) Solve:  $x-2 = 0 \Rightarrow x = 2$

5) HA:  $n = 2, m = 3$  ( $n < m$ )

$y = 0$

