V.A.

Set $x+5=0 \longrightarrow \boxed{x=-5}$

(d) $f(x) = \dfrac{x^2}{x^2+x-6} = \dfrac{x^2}{(x+3)(x-2)}$ (Factor)

Set $(x+3)(x-2)=0$

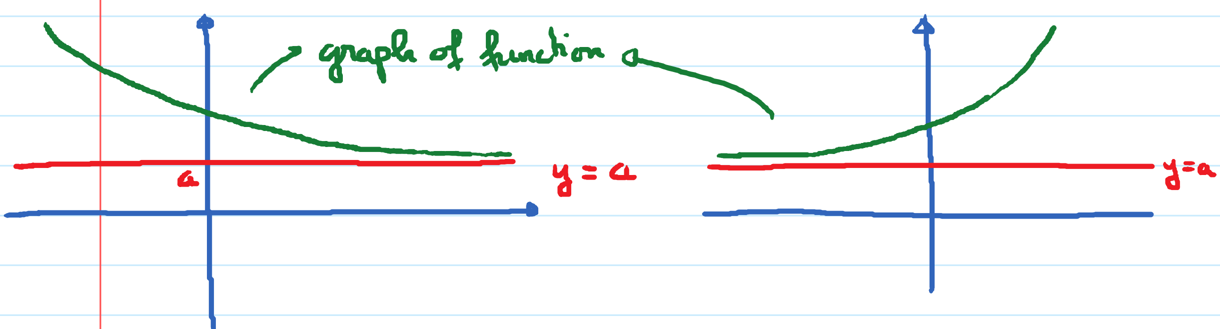
$x+3=0$; $x-2=0$

$\boxed{x=-3}$; $\boxed{x=2}$

V.A. V.A.

Obj 3: Find horizontal asymptotes of rational functions

Horizontal asymptotes:



Process of finding horizontal asymptotes of rational functions.

highest exponent

Compare the $\boxed{\text{degree}}$ of top with $\boxed{\text{degree}}$ of bottom

Case 1: Degree of top > degree of bottom

Conclusion: $\boxed{\text{No Horizontal Asymptote}}$

Case 2: Degree of top = Degree of bottom.

Conclusion: The horizontal asymptote is the line

$$\boxed{y = \frac{\boxed{a}}{\boxed{b}}}$$

a → leading coefficient of top

b → Leading coefficient of bottom

Case 3: Degree of top < Degree of bottom.

Conclusion: The horizontal asymptote is the line : $\boxed{y = 0}$

E.g. Find the horizontal asymptotes if any of the rational function.

ⓐ $f(x) = \dfrac{9x^2}{3x^2+1}$; ⓑ $g(x) = \dfrac{9x}{3x^2+1}$

ⓒ $h(x) = \dfrac{9x^3}{3x^2+1}$; ⓓ $u(x) = \dfrac{5-2x-x^2}{7x^2+x-4}$

Solution:

(a) Degree top = Degree bottom = 2

Leading coeff. top = 9

Leading coeff. bottom = 3

Horizontal Asymptote: $y = \frac{9}{3} = 3$

Answer: $\boxed{y = 3}$

(b) Degree top = 1 < Degree bottom = 2.

H.A. $\boxed{y = 0}$

(c) Degree top = 3 > Degree bottom = 2

H.A. : $\boxed{\text{There is none}}$.

(d) Degree top = 2 = Degree bottom

Leading coeff. top = −1

Leading coeff. bottom = 7

H.A. $\boxed{y = \frac{-1}{7}}$