

Nom = Ahmed.

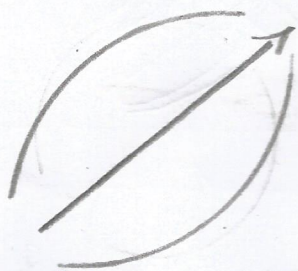
Prénom = Mohamed Ahmed.

Classe = 7<sup>Δ</sup>4.

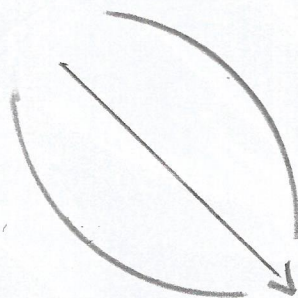
Ecoles = ELmaarif

Année = 2018 - 2019.

# Sens de variation =

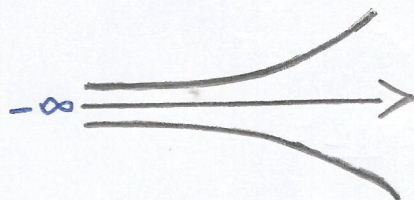


• fonction croissante

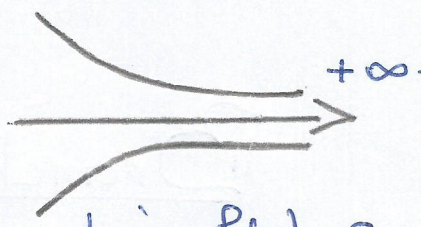


• fonction décroissante

## Asymptotes horizontales =

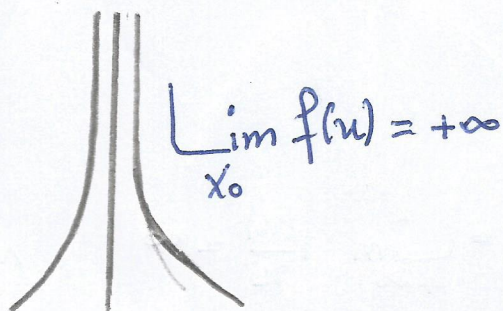


$$\lim_{x \rightarrow -\infty} f(x) = a.$$

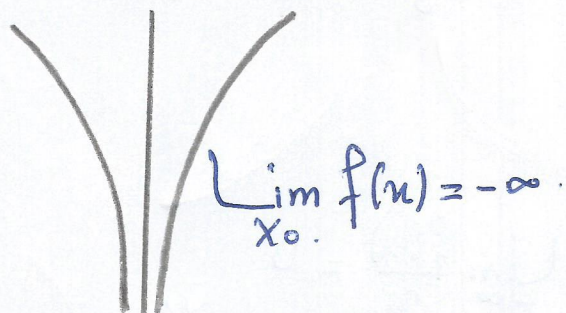


$$\lim_{x \rightarrow +\infty} f(x) = a.$$

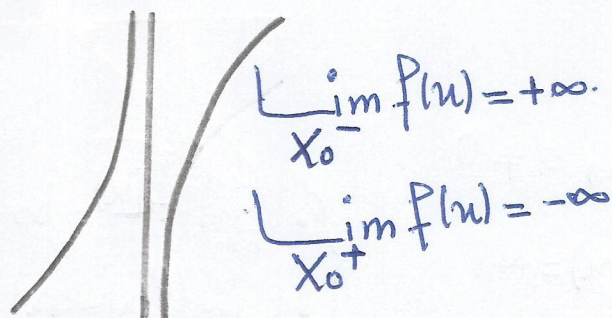
## Asymptotes verticales =



$$\lim_{x \rightarrow x_0^-} f(x) = +\infty$$
$$\lim_{x \rightarrow x_0^+} f(x) = -\infty$$

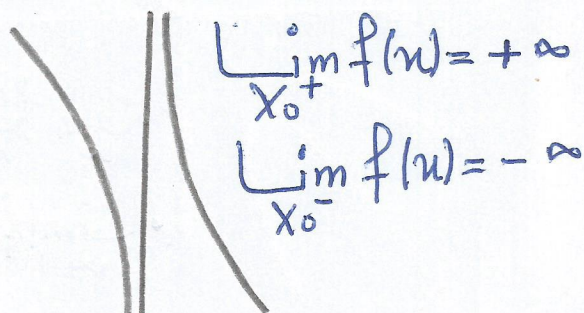


$$\lim_{x \rightarrow x_0^-} f(x) = -\infty$$
$$\lim_{x \rightarrow x_0^+} f(x) = +\infty$$



$$\lim_{x \rightarrow x_0^-} f(x) = +\infty$$

$$\lim_{x \rightarrow x_0^+} f(x) = -\infty$$



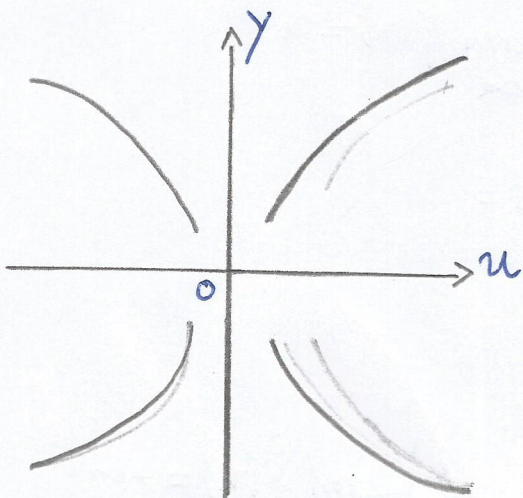
$$\lim_{x \rightarrow x_0^+} f(x) = +\infty$$

$$\lim_{x \rightarrow x_0^-} f(x) = -\infty$$

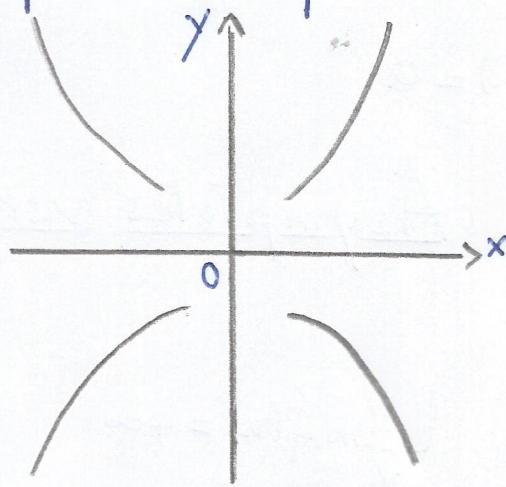
# Asymptotes obliques =



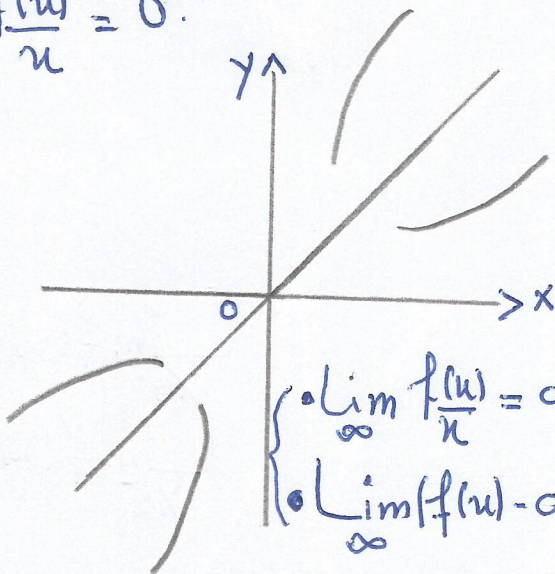
## Branche parabolique =



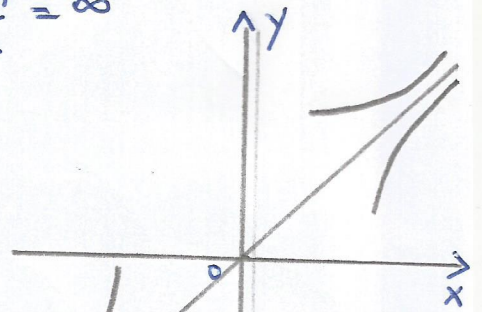
$$\bullet \lim_{+\infty} \frac{f(u)}{u} = 0.$$



$$\bullet \lim_{+\infty} \frac{f(x)}{x} = \infty$$

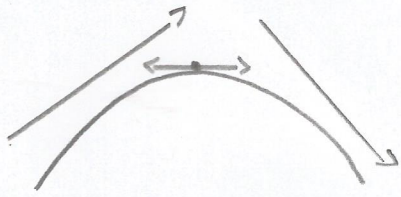


$$\begin{cases} \bullet \lim_{\infty} \frac{f(x)}{x} = a, a \neq 0 \\ \bullet \lim_{\infty} (f(x) - ax) = \infty \end{cases}$$



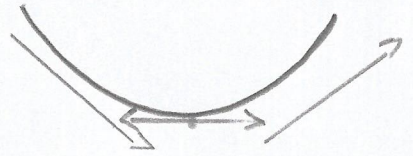
$$\begin{cases} \bullet \lim_{\infty} f(x) = \infty \\ \bullet \lim_{\infty} (f(x) - ax) = b \end{cases}$$

# Extremum =



$x$	$x_0$
$f'$	$+ \quad   \quad -$

• maximum



$x$	$x_0$
$f'$	$- \quad   \quad +$

• minimum