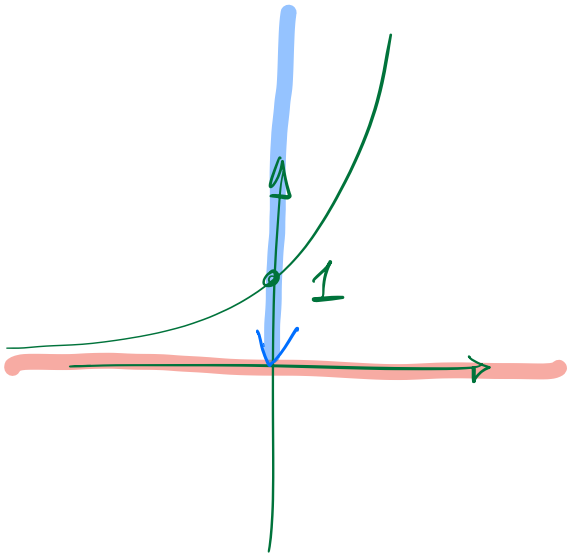
$$\begin{aligned} \mathbb{R} &\longrightarrow \mathbb{R} \\ x &\longmapsto e^x \end{aligned}$$



$$\begin{aligned} \mathbb{R} &\longrightarrow]0;+\infty[\\ x &\longmapsto e^x \end{aligned}$$

Image de l'exp. : $]0;+\infty[= \mathbb{R}_+^*$

$\exp : \mathbb{R} \to \mathbb{R}$ est injective et non surjective

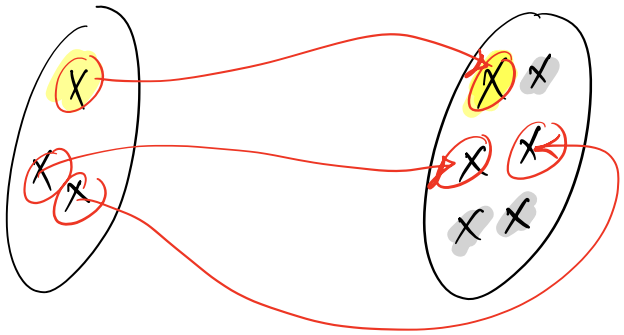
$\operatorname{Im}(\exp) \neq \mathbb{R}$

$\exp : \mathbb{R} \to]0;+\infty[$ est injective et surjective.

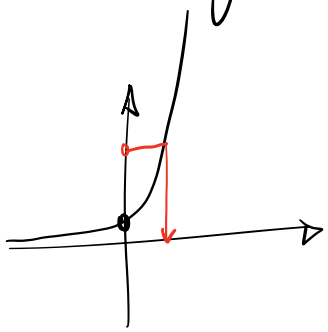
Def: $f: \mathbb{R} \to \mathbb{R}$ est

injective si $\forall x, y \in \mathbb{R}$ $f(x) = f(y) \Rightarrow x = y$

$x \neq y \Rightarrow f(x) \neq f(y)$

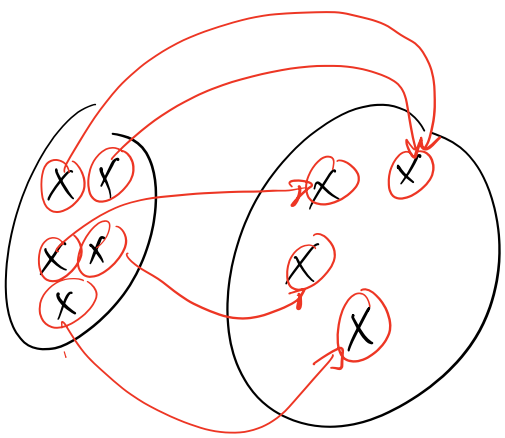


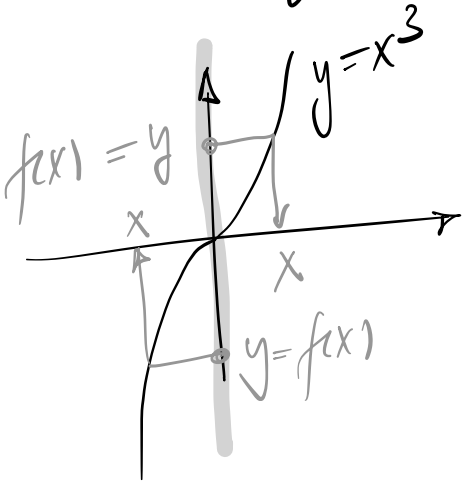
exp est injective : $e^x = e^y \Leftrightarrow x = y$



surjective si $\forall y \in \mathbb{R}$ $\exists x \in \mathbb{R}$ tq.

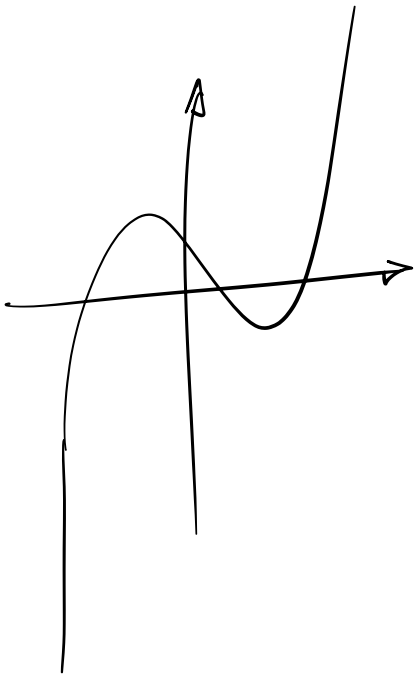
$f(x) = y$





$\exp : \mathbb{R} \to \mathbb{R}$ non surjective

$\exp : \mathbb{R} \to]0; +\infty[$ surjective

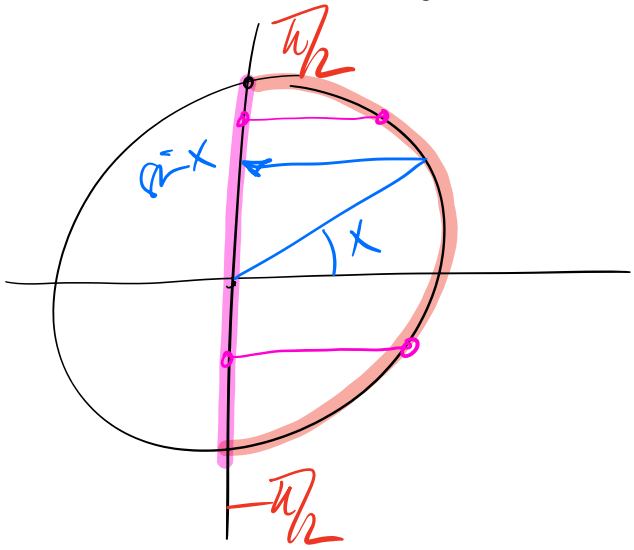


$\mathbb{R} \to \mathbb{R}$ n'est pas
$x \mapsto x^2 - 1$ surjective

$\mathbb{R} \to [-1; +\infty[$
$x \mapsto x^2 - 1$ est surjective

Une fonction est dite <u>bijective</u> si elle est à la fois <u>injective</u> et <u>surjective</u>.

<u>Exemple</u> : $\log :]0; +\infty[\xrightarrow{\sim} \mathbb{R}$ est bijective



$\sin : \left[-\frac{\pi}{2}; \frac{\pi}{2}\right] \longrightarrow [-1; 1]$

est bijective

$\arcsin : [-1; 1] \to \left[-\frac{\pi}{2}; \frac{\pi}{2}\right]$