$f$

injective

surjective

bijective

($\exists$ reciprok)

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

$x \mapsto 2x+b$

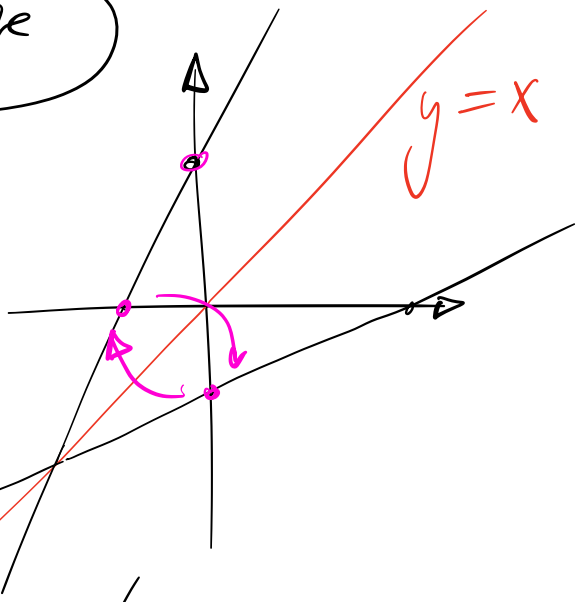
bijective

$y = 2x+b$

$y - b = 2x$

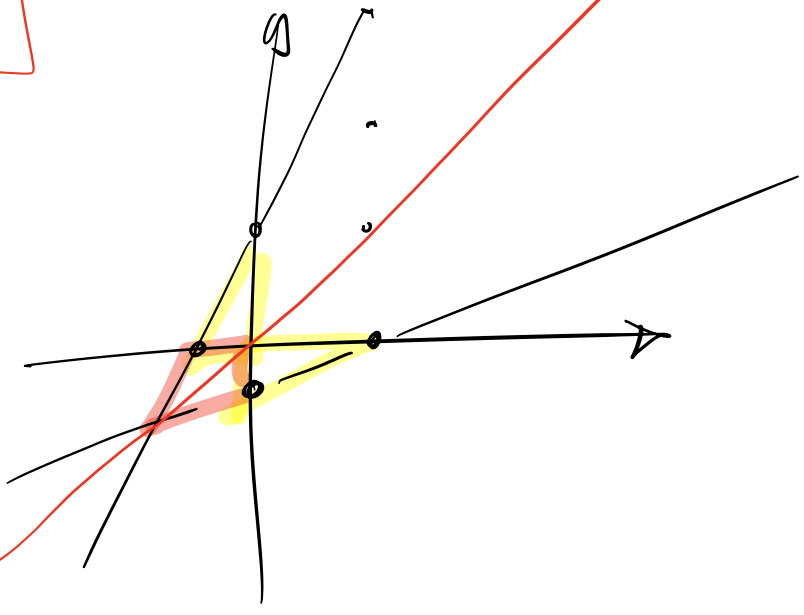
$\frac{y}{2} - \frac{b}{2} = x$

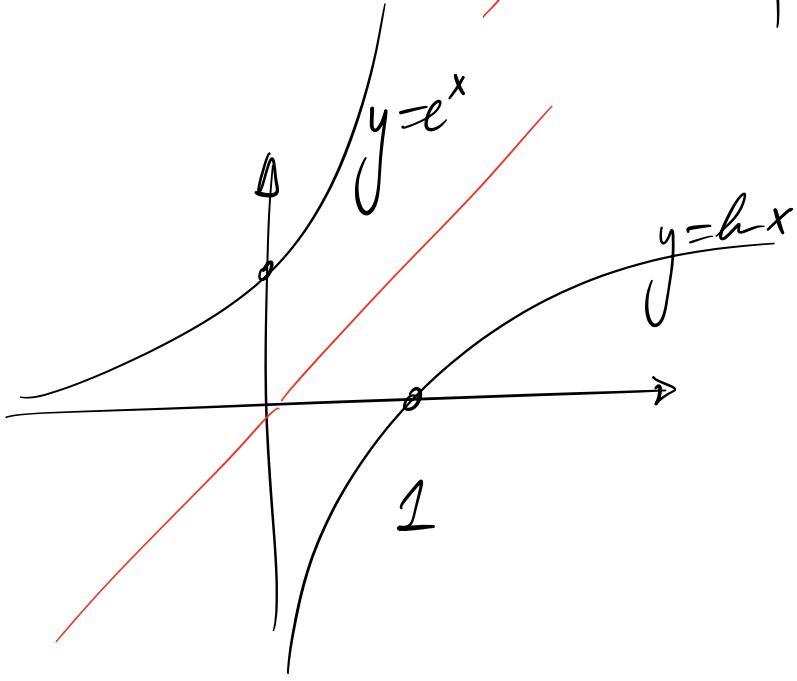
$x = \frac{1}{2}y - \frac{b}{2}$




$y = 2x+1$

$x = \frac{1}{2}y - \frac{1}{2}$



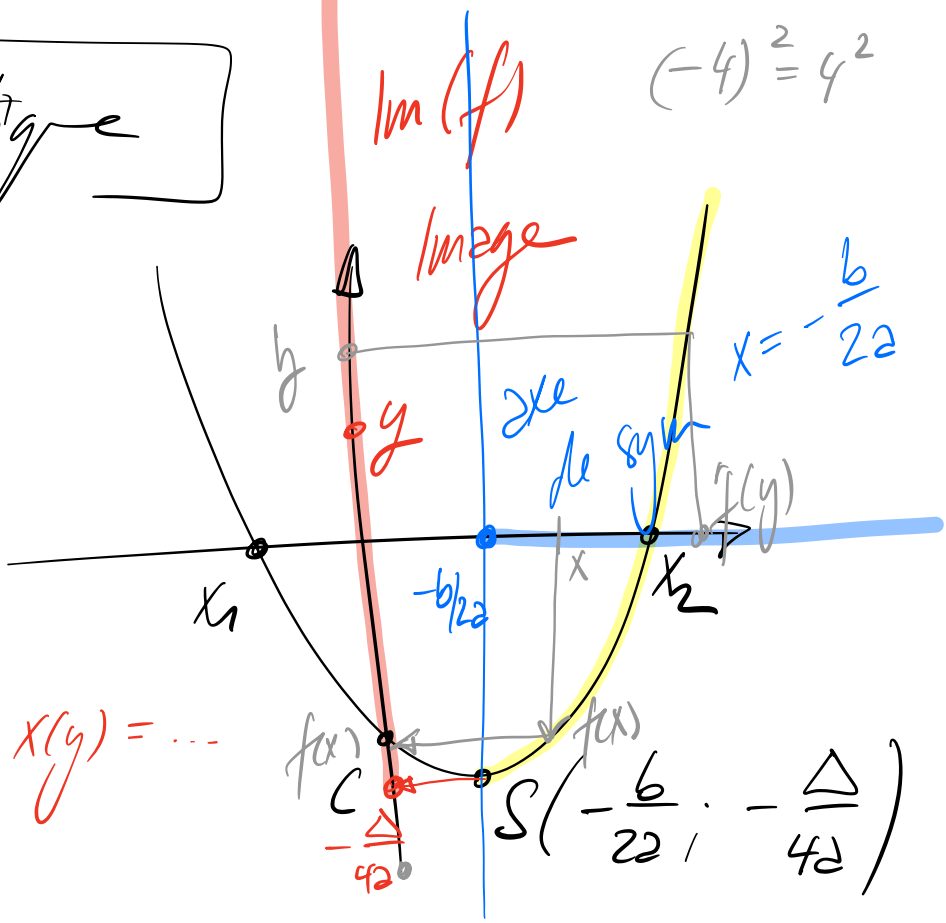



# Fonction quadratique

$\mathbb{R} \xrightarrow{f} \mathbb{R}$

$x \longmapsto ax^2+bx+c$

$a>0$




$ax^2+bx+c = y(x) \Rightarrow x(y) = \dots$

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

Quel est $D_f$ ?

Donner l'expression mathématique de $f$.

$f(y) = \,?$

$x(y) =$

$$ax^2+bx+c=y$$

$$ax^2+bx+(c-y)=0$$

$$x^2+\frac{b}{a}x+\frac{(c-y)}{a}=0$$

$A^2+2AB$

$$x^2+2\cdot x\cdot\frac{b}{2a}+\frac{b^2}{4a^2}-\frac{b^2}{4a^2}+\frac{c-y}{a}=0$$

$$\left(x+\frac{b}{2a}\right)^2-\left(\frac{b^2}{4a^2}-\frac{c-y}{a}\right)=0$$

$$\vdots$$

$$x=\frac{-b\pm\sqrt{b^2-4ac+4ay}}{2a}$$

$$f(y)=\frac{-b+\sqrt{b^2-4ac+4ay}}{2a}$$

$$\Delta=b^2-4\cdot a\cdot(c-y)$$

$$=b^2-4ac+4ay$$

$$x=\frac{-b+\sqrt{\Delta}}{2a}$$

$$x=\frac{-b-\sqrt{\Delta}}{2a}$$

Branche de droite

ler $a>0$

$$D_f:\ b^2-4ac+4ay>0$$

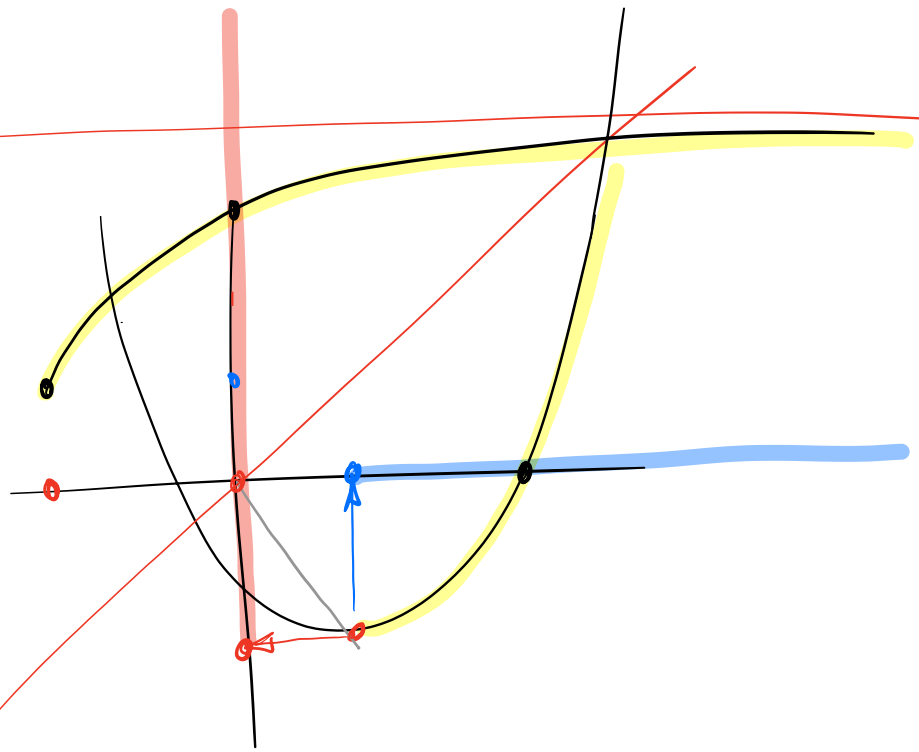
$$\Leftrightarrow \quad 4ay > -\Delta$$

$$\Leftrightarrow \quad y > -\frac{\Delta}{4a} \qquad (a>0)$$

$$f : \left[-b/2a ; +\infty\right[ \longrightarrow \left[-\frac{\Delta}{4a} ; +\infty\right[$$

$$x \longmapsto ax^2+bx+c$$

$$\frac{-b+\sqrt{\Delta+4ay}}{2a} \longleftarrow y$$



Exercice : Travers le réajr