Funzioni elementari

Funzioni algebriche

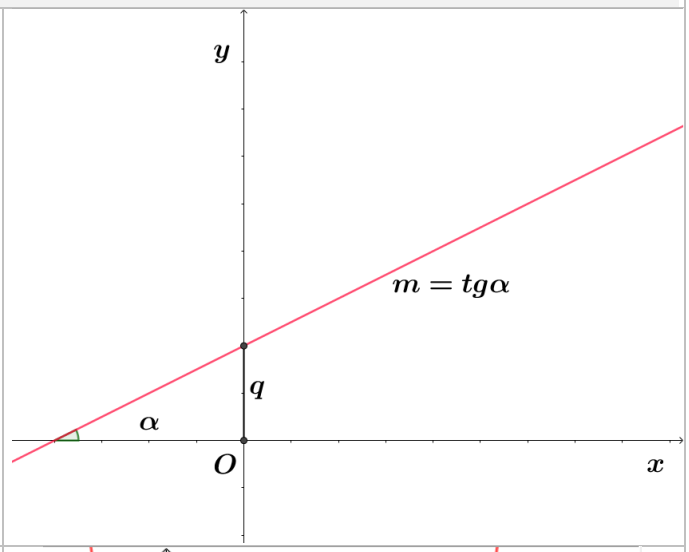
Funzione lineare

$y = mx + q$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $m > 0 \quad \Rightarrow$ retta crescente
- $m < 0 \quad \Rightarrow$ retta decrescente
- $m = 0 \quad \Rightarrow$ retta $\parallel$ asse x

- $q =$ ordinata all'origine



Funzione quadratica

$y = ax^2 + bx + c \qquad a \neq 0$

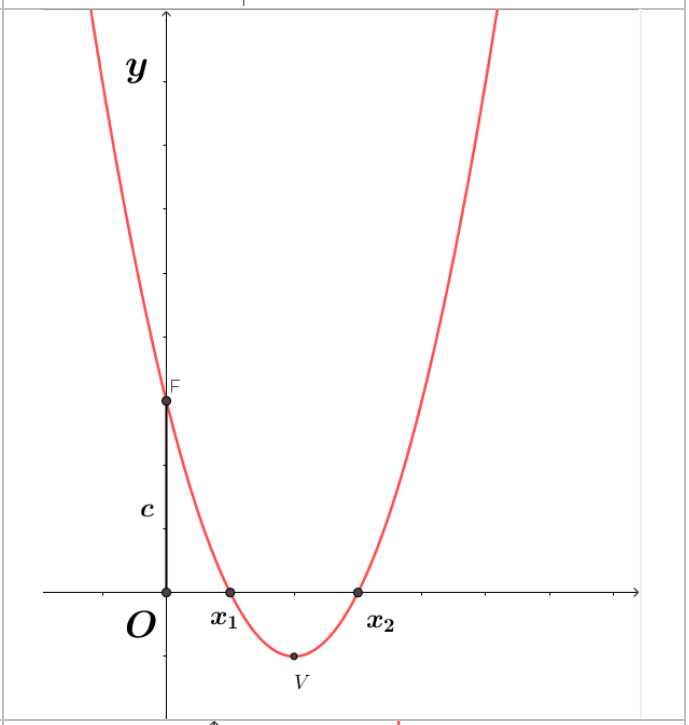
Dominio $D = \{x : x \in \mathbb{R}\}$

- $a > 0 \quad \Rightarrow$ concavità verso l'alto
- $a < 0 \quad \Rightarrow$ concavità verso il basso

- $x_1,\ x_2 \quad \Rightarrow$ zeri della funzione

- $c =$ ordinata all'origine

(*Per tutte le altre caratteristiche consultare le formule della parabola*)



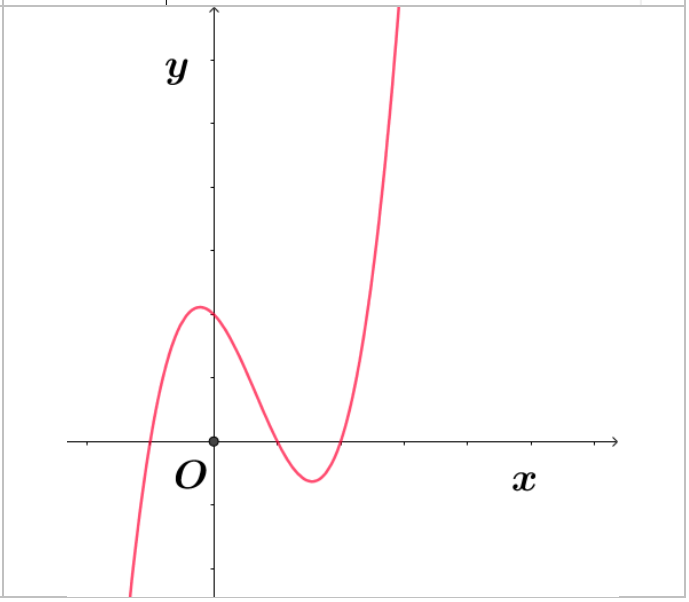
Funzione cubica

$y = ax^3 + bx^2 + cx + d \qquad a \neq 0$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $a > 0 \quad \Rightarrow \quad \lim_{x \to -\infty} y = -\infty \quad \lim_{x \to +\infty} y = +\infty$
- $a < 0 \quad \Rightarrow \quad \lim_{x \to -\infty} y = +\infty \quad \lim_{x \to +\infty} y = -\infty$

- $d =$ ordinata all'origine



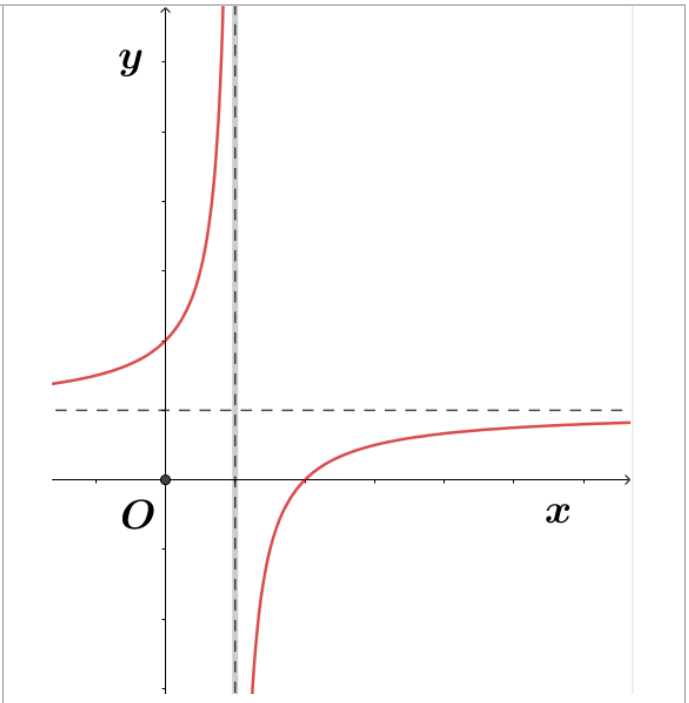
Funzione omografica

$$y=\frac{ax+b}{cx+d} \qquad \begin{cases} c\neq 0 \\ ad-bc\neq 0 \end{cases}$$

Dominio $D=\left\{x: x\in\mathbb{R},\ x\neq -\frac{d}{c}\right\}$

- $ad-bc>0 \Rightarrow$ funzione crescente
- $ad-bc<0 \Rightarrow$ funzione decrescente

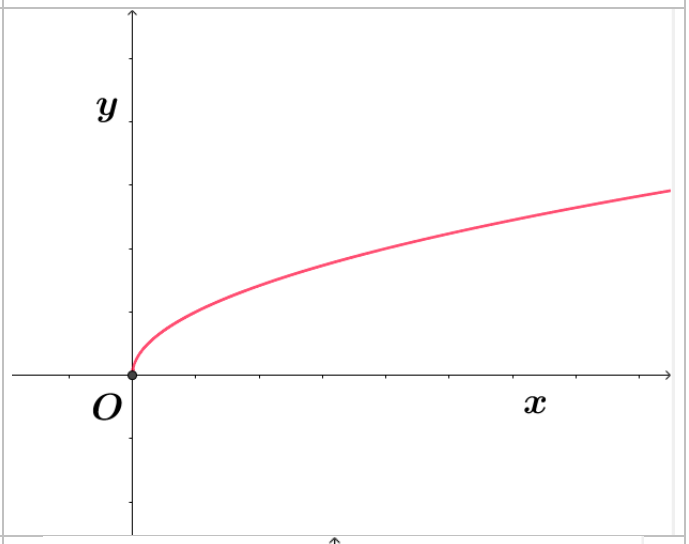
- $x=-\frac{d}{c} \Rightarrow$ asintoto verticale
- $y=\frac{a}{c} \Rightarrow$ asintoto orizzontale
- $C\left(-\frac{d}{c};\frac{a}{c}\right) \Rightarrow$ centro di simmetria



Funzione radice

$$y=\sqrt{x}$$

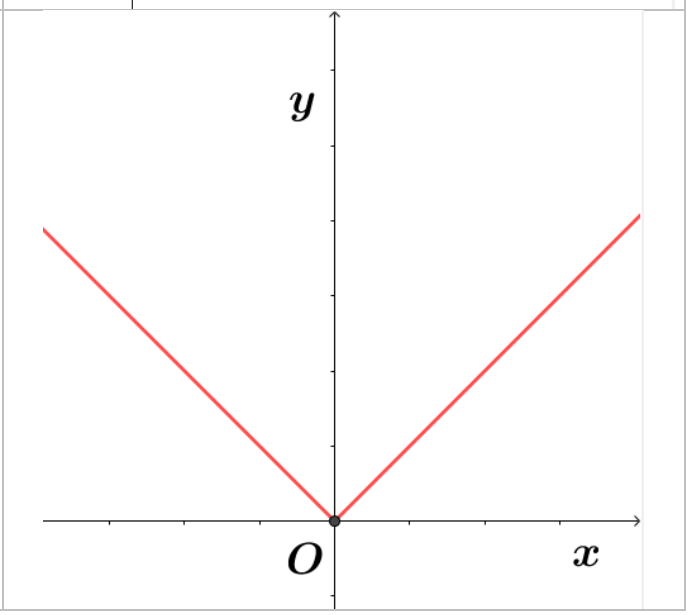
Dominio $D=\left\{x: x\in\mathbb{R},\ x\geq 0\right\}$



Funzione valore assoluto

$$y=|x|$$

Dominio $D=\left\{x: x\in\mathbb{R}\right\}$



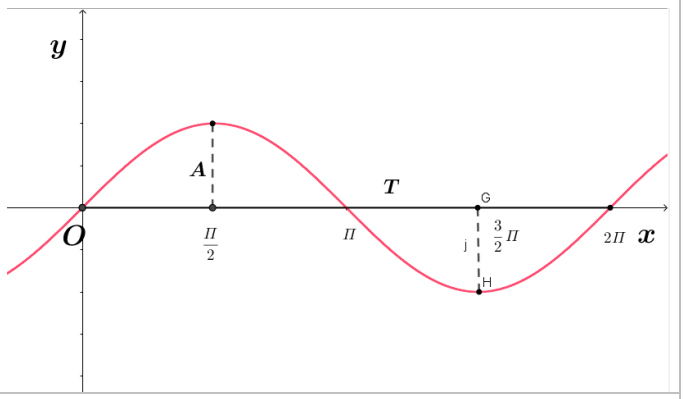
Funzioni trascendenti

Funzione seno

$y = \operatorname{sen} x$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $T = 2\pi$ (periodo)
- $A = 1$

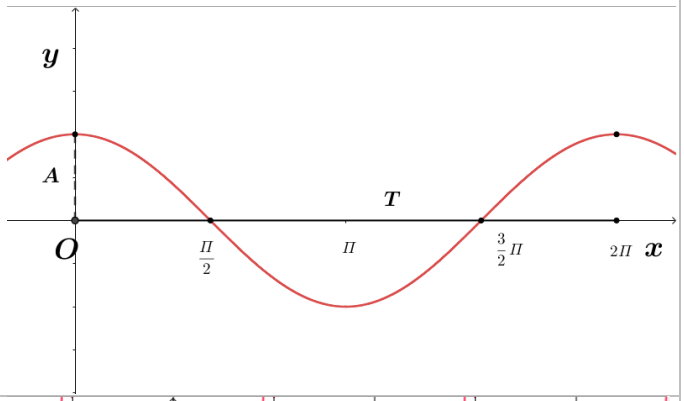


Funzione coseno

$y = \operatorname{sen} x$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $T = 2\pi$ (periodo)
- $A = 1$

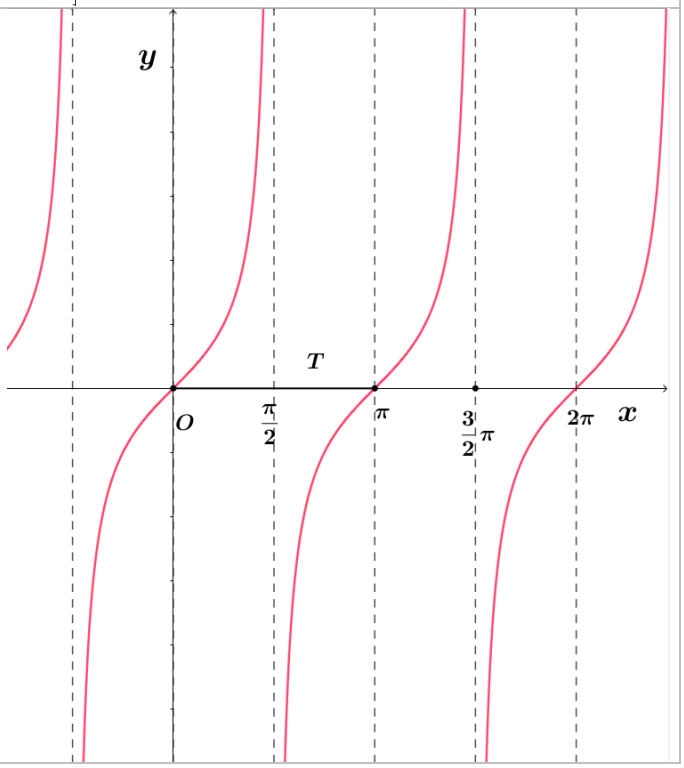


Funzione tangente

$y = \operatorname{tg} x$

Dominio $D = \left\{x : x \in \mathbb{R}, x \neq \frac{\pi}{2} + k\pi; k \in \mathbb{Z}\right\}$

- $T = \pi$ (periodo)

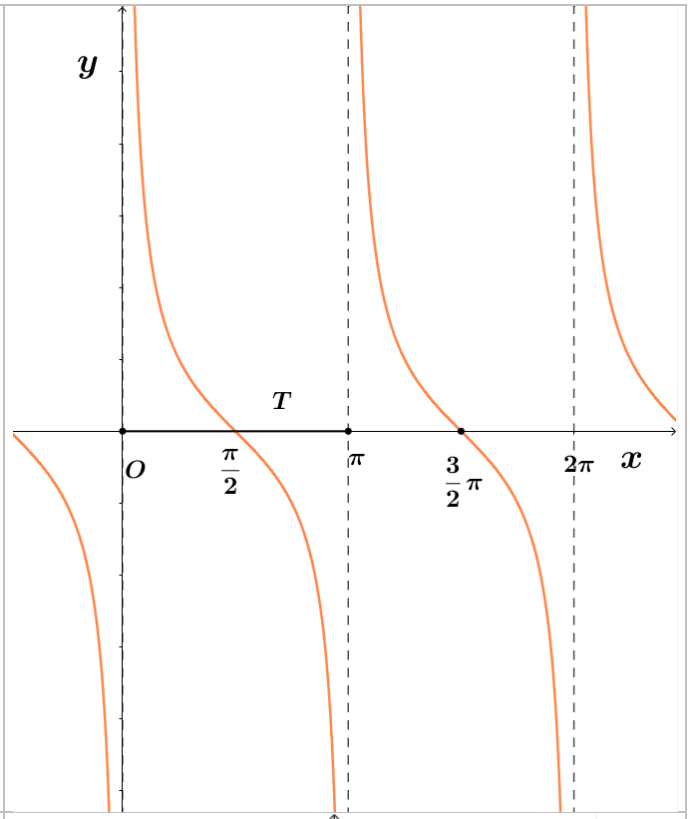


Funzione cotangente

$y = \operatorname{cotg} x$

Dominio $D = \{x : x \in \mathbb{R}, x \neq k\pi; k \in \mathbb{Z}\}$

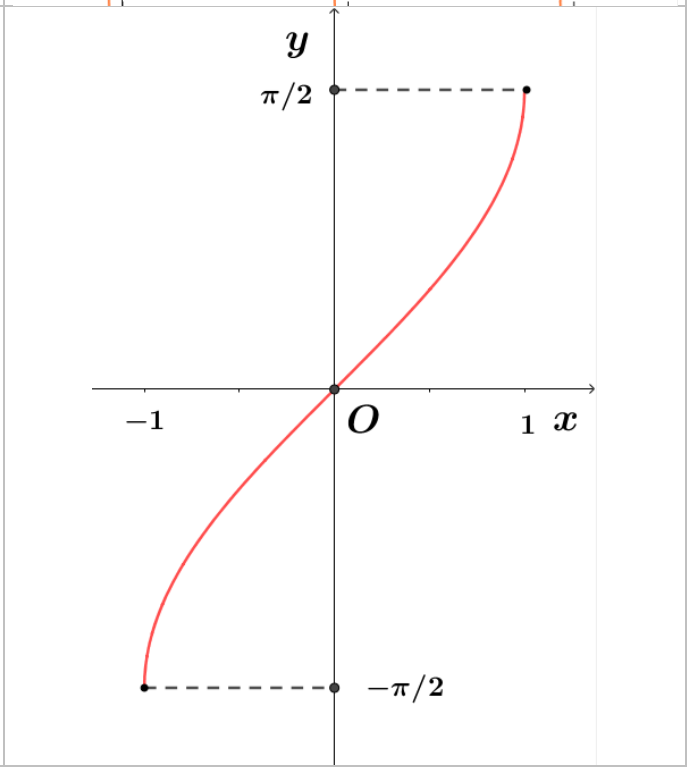
- $T = \pi$ (periodo)



Funzione arcoseno

$y = \operatorname{arcsen} x$

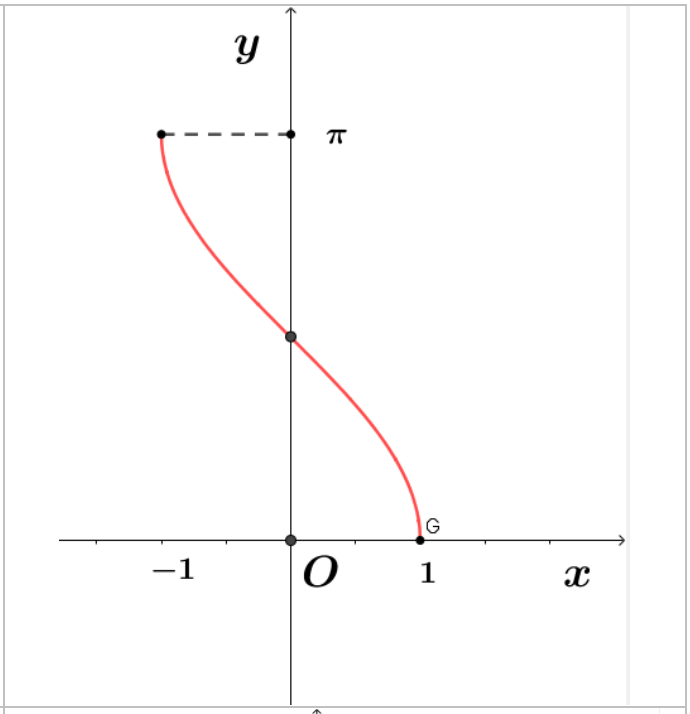
Dominio $D = \{x : x \in \mathbb{R}, \ -1 < x < 1\}$



Funzione arcocoseno

$y = \arccos x$

Dominio $D = \{x : x \in \mathbb{R},\ -1 < x < 1\}$

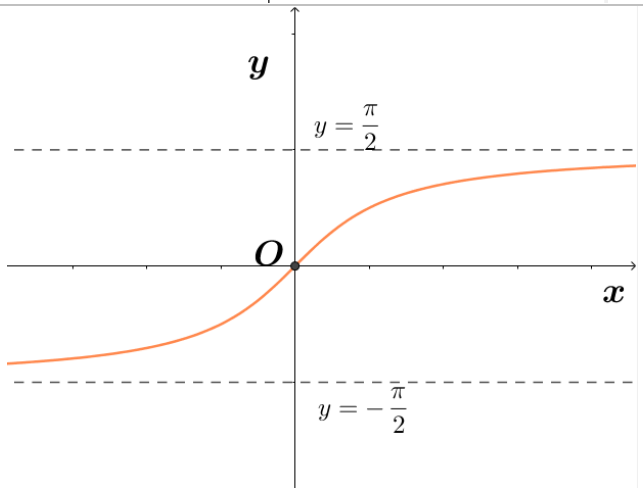


Funzione arcotangente

$y = \operatorname{arctg} x$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $\lim_{x \to -\infty} y = -\frac{\pi}{2}$
- $\lim_{x \to +\infty} y = +\frac{\pi}{2}$

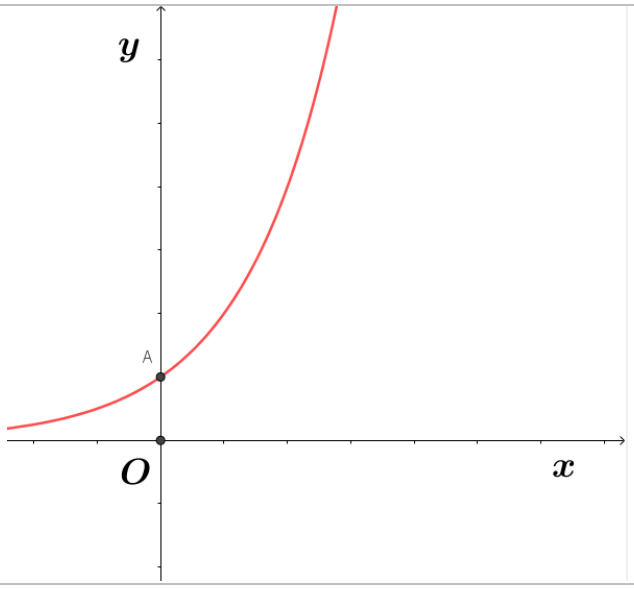


Funzione esponenziale crescente

$y = a^x$ $\quad a > 1$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $A \in f(x) \quad \forall a > 1$
- $\lim_{x \to -\infty} y = 0$
- $\lim_{x \to +\infty} y = +\infty$

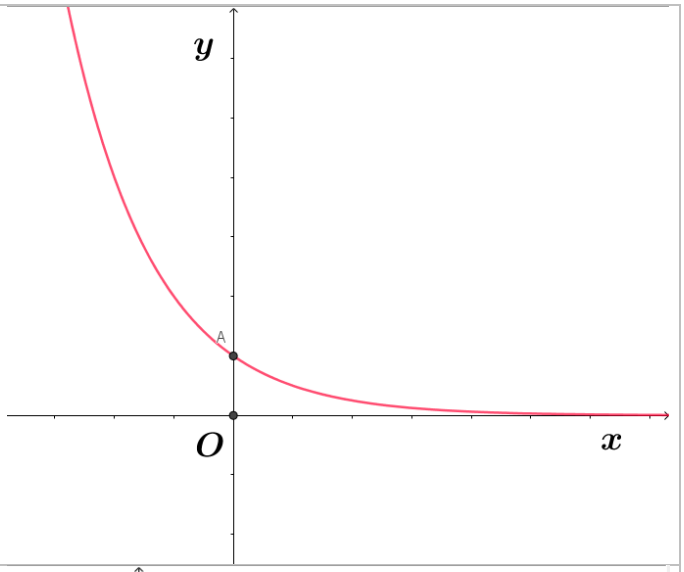


Funzione esponenziale decrescente

$y = a^x \qquad 0 < a < 1$

Dominio $D = \{x : x \in \mathbb{R}\}$

- $A \in f(x) \qquad \forall a > 1$
- $\lim_{x \to -\infty} y = +\infty$
- $\lim_{x \to +\infty} y = 0$

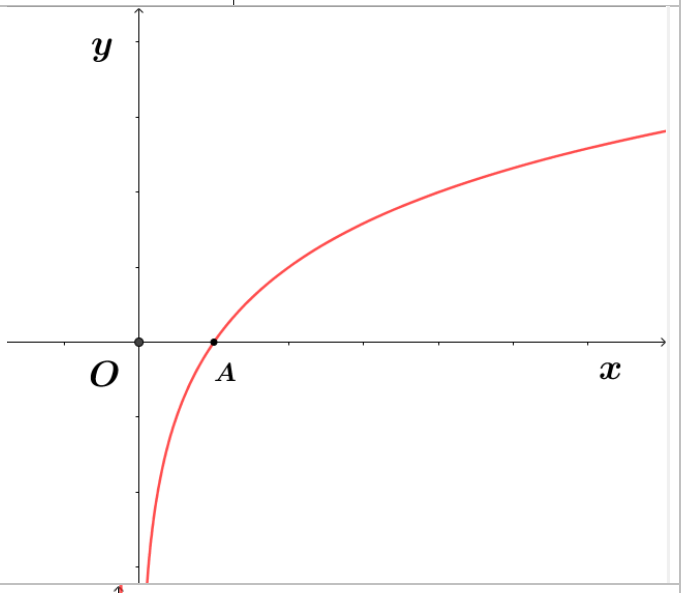


Funzione logaritmica crescente

$y = \log_a x \qquad a > 1$

Dominio $D = \{x : x \in \mathbb{R};\ x > 0\}$

- $A \in f(x) \qquad \forall a > 1$
- $\lim_{x \to +\infty} y = +\infty$
- $\lim_{x \to 0^+} y = -\infty$



Funzione logaritmica decrescente

$y = \log_a x \qquad 0 < a < 1$

Dominio $D = \{x : x \in \mathbb{R};\ x > 0\}$

- $A \in f(x) \qquad \forall a > 1$
- $\lim_{x \to +\infty} y = -\infty$
- $\lim_{x \to 0^+} y = +\infty$