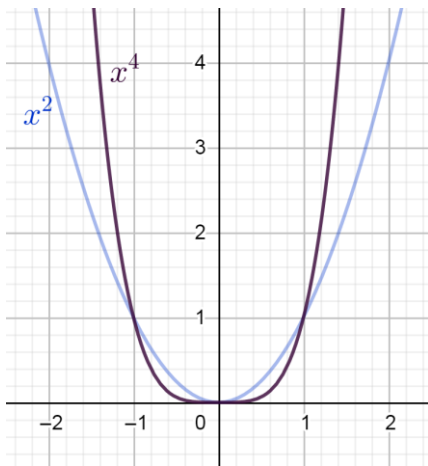


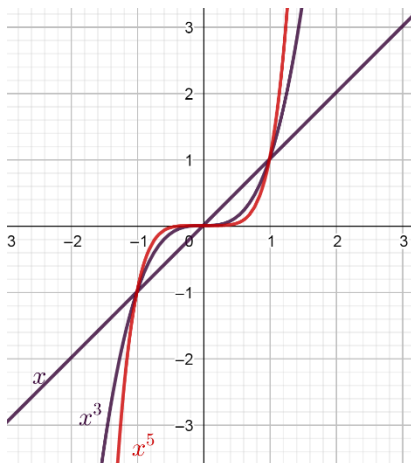
1. Grafici di funzioni elementari

Riportiamo in questo paragrafo i grafici di alcune funzioni base con le loro principali proprietà. Nei paragrafi successivi di questo capitolo ne approfondiremo e amplieremo lo studio.



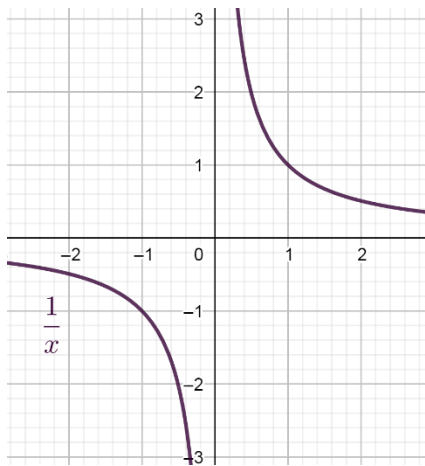
Potenze pari $f(x) = x^{2n}$

$$\begin{cases} E = \mathbb{R}; C = [0; +\infty) \\ f(x) = f(-x) \forall x \in \mathbb{R} \text{ funzione pari} \\ \text{decrescente in } (-\infty; 0); \text{ crescente in } (0; +\infty) \\ \text{minimo } (0; 0) \end{cases}$$



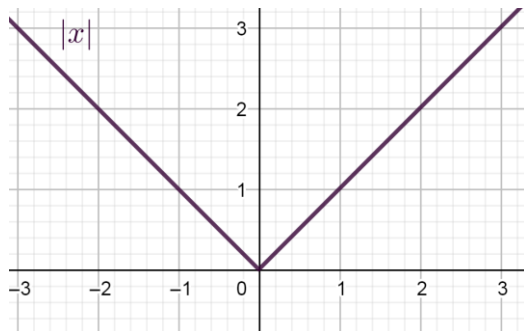
Potenze dispari $f(x) = x^{2n+1}$

$$\begin{cases} E = \mathbb{R}; C = \mathbb{R} \\ f(x) = -f(-x) \forall x \in \mathbb{R} \text{ funzione dispari} \\ \text{crescente in } \mathbb{R} \end{cases}$$



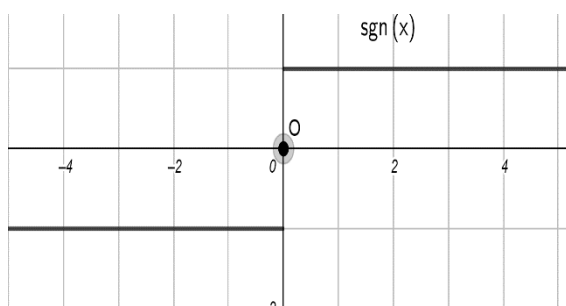
Funzione reciproca $f(x) = \frac{1}{x}$

$$\left\{ \begin{array}{l} E = \mathbb{R} - \{0\}; C = \mathbb{R} - \{0\} \\ f(x) = -f(-x) \forall x \in \mathbb{R} \text{ funzione dispari} \\ \text{decrescente in } (-\infty; 0) \cup (0; +\infty) \end{array} \right.$$



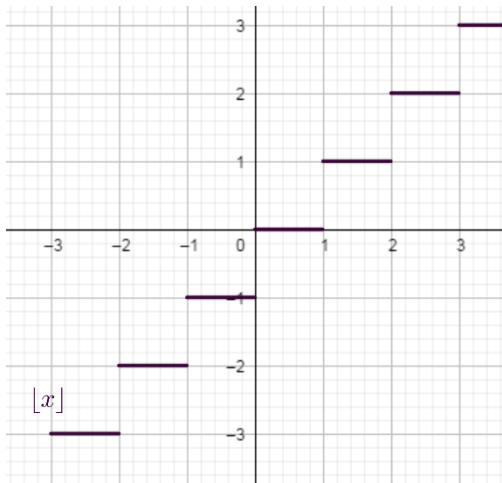
Funzione valore assoluto $f(x) = |x| = \begin{cases} x & \text{se } x \geq 0 \\ -x & \text{se } x < 0 \end{cases}$

$$\left\{ \begin{array}{l} E = \mathbb{R}; C = [0; +\infty) \\ f(x) = f(-x) \forall x \in \mathbb{R} \text{ funzione pari} \\ \text{decrescente in } (-\infty; 0); \text{ crescente in } (0; +\infty) \\ \text{minimo}(0; 0) \end{array} \right.$$



Funzione segno $f(x) = \text{sign } x = \begin{cases} -1 & \text{se } x < 0 \\ 0 & \text{se } x = 0 \\ 1 & \text{se } x > 0 \end{cases}$

$$\left\{ \begin{array}{l} E = \mathbb{R}; C = \{-1; 0; 1\} \\ f(x) = -f(-x) \forall x \in \mathbb{R} \text{ funzione dispari} \\ \text{non decrescente} \end{array} \right.$$



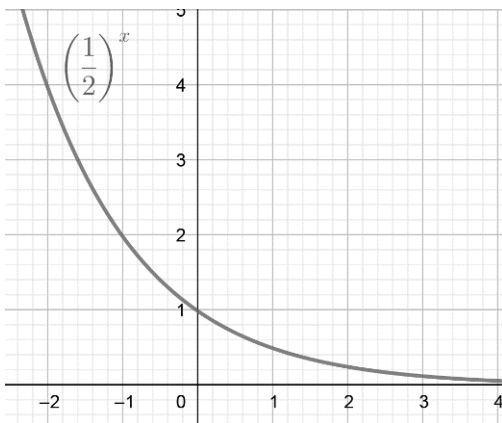
Funzione parte intera

$$f(x) = [x] = \text{intero più vicino } \leq \text{ di } x$$

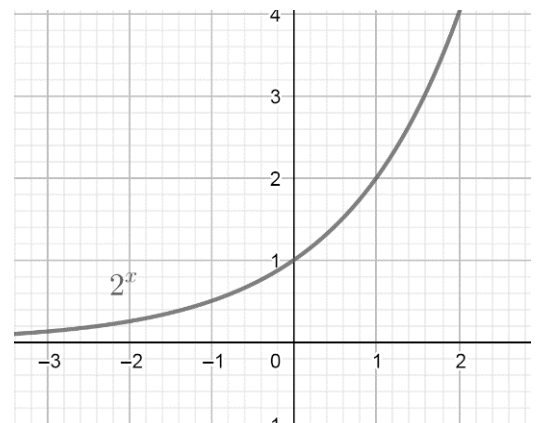
$$\begin{cases} E = \mathbb{R}; C = \mathbb{Z} \\ f(x) \text{ non decrescente} \end{cases}$$

Funzione esponenziale $f(x) = a^x$ ($a > 0; a \neq 1$)

$$E = \mathbb{R}; C = (0; +\infty)$$



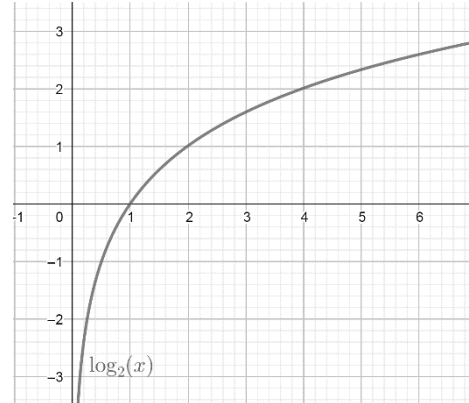
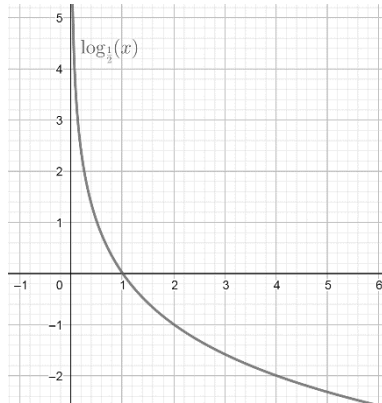
$0 < a < 1$ decrescente



$a > 1$ crescente

Funzione logaritmica $f(x) = \log_a x \quad (a > 0; a \neq 1)$

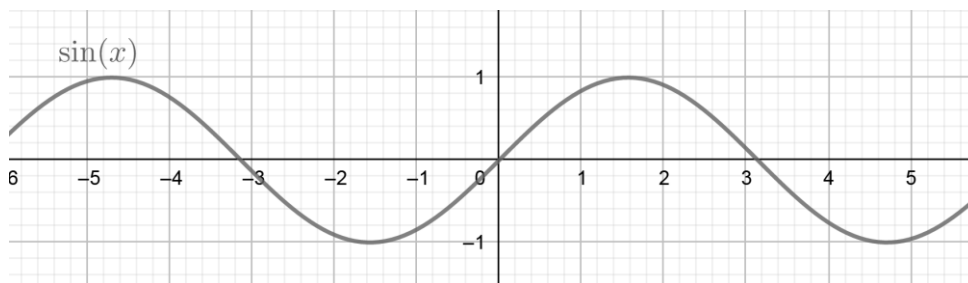
$$E = (0; +\infty); \mathcal{C} = \mathbb{R}$$



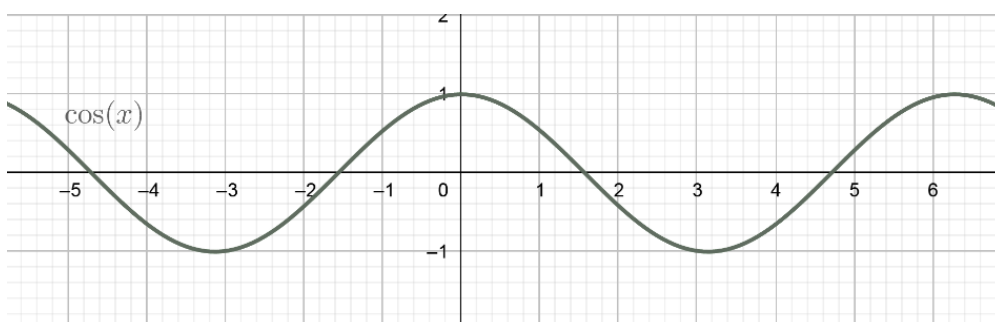
$0 < a < 1$ *decrescente*

$a > 1$ *crescente*

Funzione seno $f(x) = \sin x$ $\left\{ \begin{array}{l} E = \mathbb{R}; \mathcal{C} = [-1; 1] \\ \text{minimo} = -1; \text{massimo} = 1 \\ \text{funzione dispari, periodica } T = 2\pi \end{array} \right.$

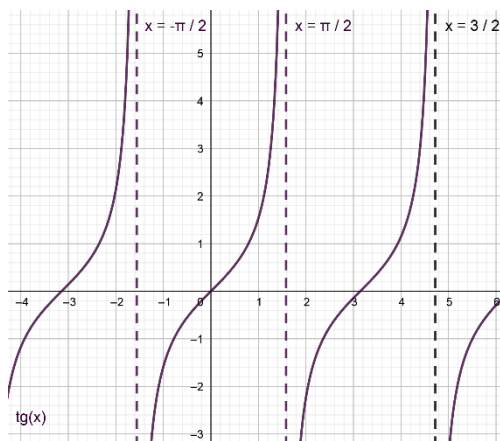


Funzione coseno $f(x) = \cos x$ $\left\{ \begin{array}{l} E = \mathbb{R}; \mathcal{C} = [-1; 1] \\ \text{minimo} = -1; \text{massimo} = 1 \\ \text{funzione pari, periodica } T = 2\pi \end{array} \right.$



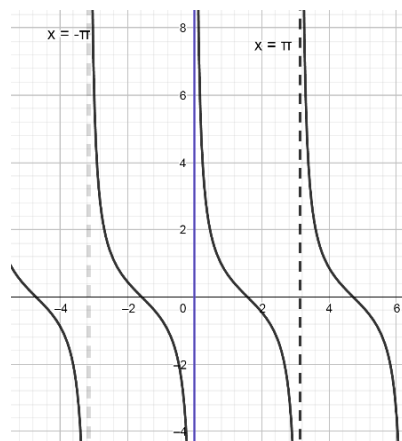
Funzione tangente $f(x) = \operatorname{tg} x$

$$\left\{ \begin{array}{l} E = \mathbb{R} - \left\{ \frac{\pi}{2} + k\pi; k \in \mathbb{Z} \right\}; C = \mathbb{R} \\ \text{periodica } T = \pi \end{array} \right.$$



Funzione cotangente $f(x) = \operatorname{ctg} x$

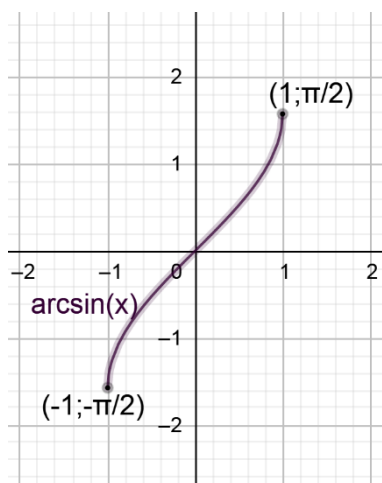
$$\left\{ \begin{array}{l} E = \mathbb{R} - \{ \pi + k\pi; k \in \mathbb{Z} \}; C = \mathbb{R} \\ \text{periodica } T = \pi \end{array} \right.$$



Funzione arcseno

$$f(x) = \arcsin x$$

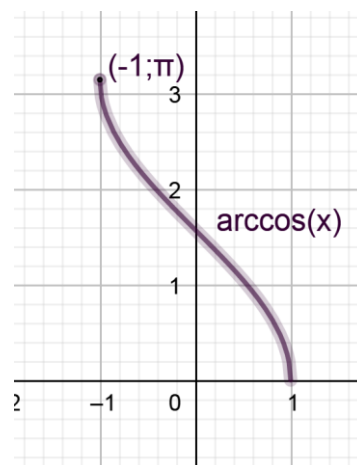
$$\left\{ \begin{array}{l} E = [-1; 1]; C = \left[-\frac{\pi}{2}; \frac{\pi}{2} \right] \\ \text{funzione dispari, crescente in } [-1; 1] \end{array} \right.$$



Funzione arcocoseno

$$f(x) = \arccos x$$

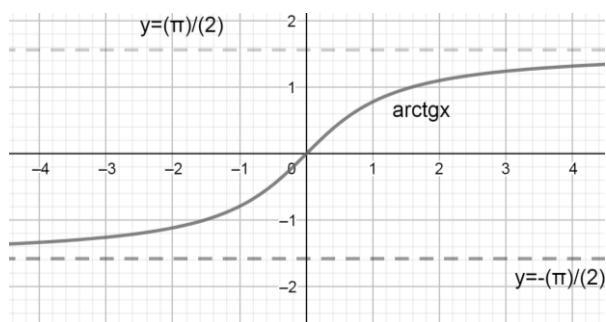
$$\left\{ \begin{array}{l} E = [-1; 1]; C = [0; \pi] \\ \text{decescente in } [-1; 1] \end{array} \right.$$



Funzione arcotangente

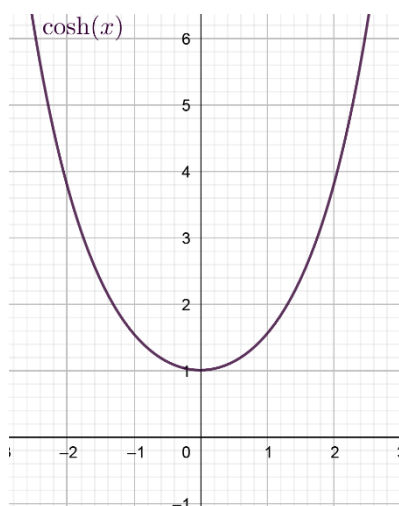
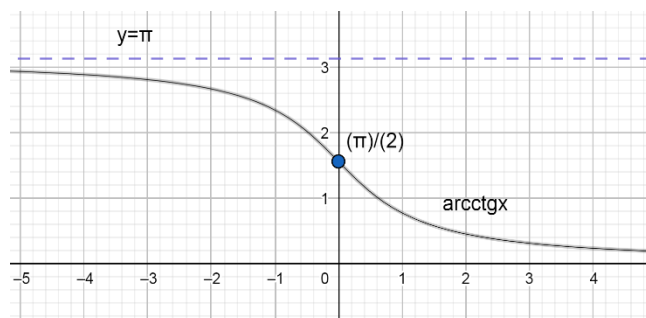
$$f(x) = \operatorname{arctg} x$$

$$\begin{cases} E = \mathbb{R}; C = \left(-\frac{\pi}{2}; \frac{\pi}{2}\right) \\ \text{funzione dispari, crescente in } \mathbb{R} \end{cases}$$

**Funzione arcocotangente**

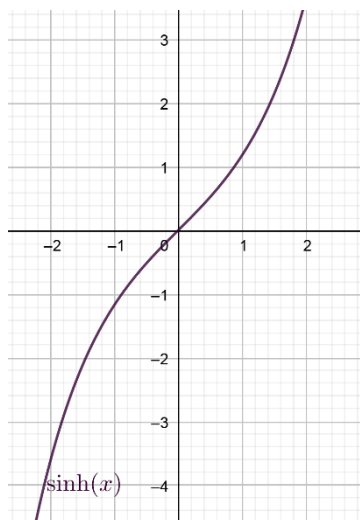
$$f(x) = \operatorname{arcctg} x$$

$$\begin{cases} E = \mathbb{R}; C = (0; \pi) \\ \text{funzione decrescente in } \mathbb{R} \end{cases}$$



Funzione coseno iperbolico $f(x) = \cosh x = \frac{e^x + e^{-x}}{2}$

$$\begin{cases} E = \mathbb{R}; C = [1; +\infty) \\ \text{funzione pari} \\ \text{decrescente in } (-\infty; 0); \text{crescente in } (0; +\infty) \\ \text{minimo}(0; 1) \end{cases}$$



Funzione seno iperbolico $f(x) = \sinh x = \frac{e^x - e^{-x}}{2}$

$$\begin{cases} E = \mathbb{R}; C = \mathbb{R} \\ \text{funzione dispari, crescente in } \mathbb{R} \end{cases}$$