SCHEMA FUNZIONI

f :x ∈A → f(x) **funzione** ***A = dominio* della funzione** ***f(A) codominio*** ***I* = intervallo in cui *f* può essere invertita**

funzione costante

f :x ∈ R → f(x) = c

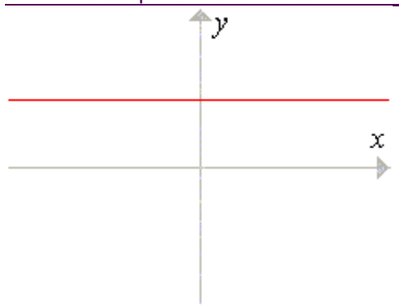
***A* = R** ***f(R)* = {c}**

***I* = Ø**

$$\lim_{x\to x_o} f(x) = c \quad \forall x_0 \in R$$

$$\lim_{x\to+\infty} f(x) = \lim_{x\to-\infty} f(x) = c$$

Retta parallela all'asse *x* ***y = c***



Applicazione identica

f :x ∈ R → f(x) = x

A = **R**

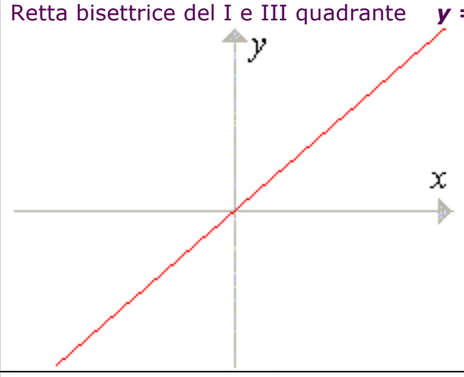
***f(R)* = R**

I = **R**

$$\lim_{x\to x_o} x = x_o \quad \forall x_0 \in R$$

$$\lim_{x\to-\infty} x = -\infty \qquad \lim_{x\to+\infty} x = +\infty$$

Retta bisettrice del I e III quadrante ***y = x***



Funzione opposta della funzione identica

f :x ∈ R → f(x) = -x

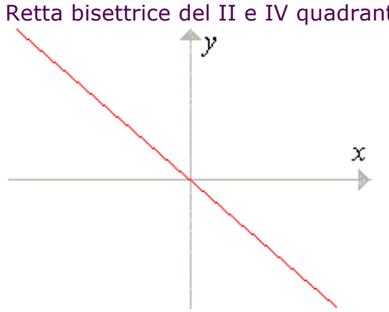
A = **R** ***f(R)* = R**

I = **R**

$$\lim_{x\to x_o}(-x) = -x_o \quad \forall x_0 \in R$$

$$\lim_{x\to-\infty}(-x) = +\infty \qquad \lim_{x\to+\infty}(-x) = -\infty$$

Retta bisettrice del II e IV quadrante ***y =-x***



Funzione valore assoluto

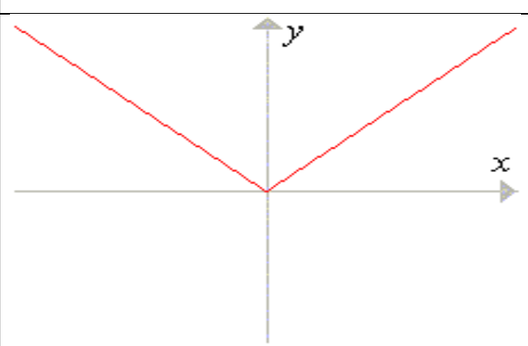
f :x ∈ R → f(x) = |x|

***A* = R** ***f(R)*= [0, +∝[**

I =**[0, +∝[o I =] -∝, 0]**

$$\lim_{x\to x_o}|x| = |x_o| \quad \forall x_0 \in R$$

$$\lim_{x\to+\infty}|x| = \lim_{x\to-\infty}|x| = +\infty$$



Funzione lineare

f :x ∈ R → f(x) = mx

***f(R)*= R se m≠0** ***f(R)*= {0} se m=0**

***I* = R se m≠0**

$$\lim_{x\to x_o} mx = mx_o \quad \forall x_0 \in R$$

$$\lim_{x\to+\infty} mx = \begin{cases} +\infty & se\ m>0 \\ -\infty & se\ m<0 \end{cases} \qquad \lim_{x\to-\infty} mx = \begin{cases} -\infty & se\ m>0 \\ +\infty & se\ m<0 \end{cases}$$

Funzione (lineare) affine

f :x ∈ R → f(x) = mx+q

***f(R)*= R se m≠0** ***f(R)*= {q} se m=0**

***I* = R se m≠0**

$$\lim_{x\to x_o} mx+q = mx_o+q \quad \forall x_0 \in R$$

$$\lim_{x\to+\infty} mx+q = \begin{cases} +\infty & se\ m>0 \\ -\infty & se\ m<0 \end{cases} \qquad \lim_{x\to-\infty} mx+q = \begin{cases} -\infty & se\ m>0 \\ +\infty & se\ m<0 \end{cases}$$

Funzione parte intera

f :x ∈ R-{0} → f(x) =1/x

***A* = R - {0}** ***f(R- {0})*= R - {0}**

***I* = R - {0}**

$$\lim_{x\to+\infty}[x] = +\infty \qquad \lim_{x\to-\infty}[x] = -\infty$$

$$\lim_{x\to z^-}[x] = z-1 \qquad \lim_{x\to z^+}[x] = z \quad \forall z \in Z$$

$$\lim_{x\to x_0}[x] = z-1 \quad \forall x_0 \in]z-1, z[\quad z \in Z$$

f :x ∈ R-{0} → f(x) = x^{-1}=1/x

funzione reciproca dell'applicazione identica

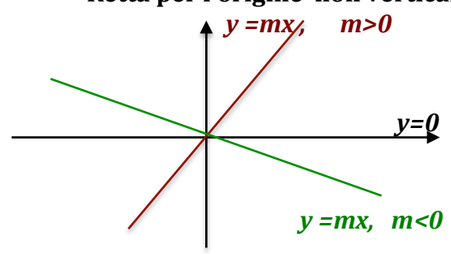
***A* = R - {0}** ***f(R- {0})*= R - {0}**

***I* = R - {0}**

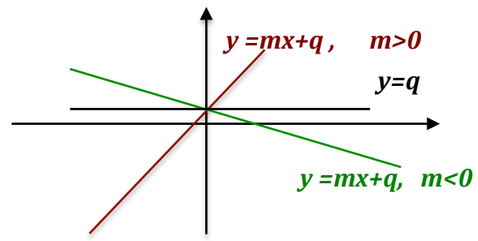
$$\lim_{x\to0^-}\frac{1}{x} = -\infty \qquad \lim_{x\to0^+}\frac{1}{x} = +\infty$$

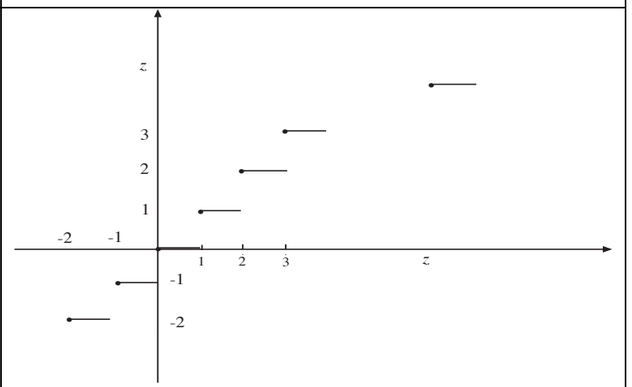
$$\lim_{x\to+\infty} 1/x = \lim_{x\to-\infty} 1/x = 0$$

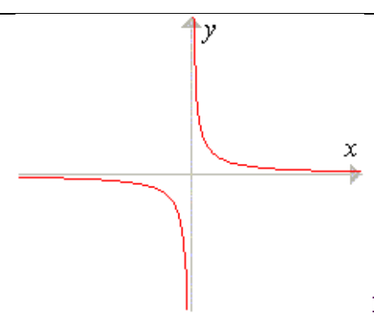
Retta per l'origine non verticale



Retta non verticale







Iperbole equilatera

SCHEMA FUNZIONI

Funzione potenza con esponente intero *n*> 0 e funzione radice n-sima

Funzione potenza di esponente intero positivo pari

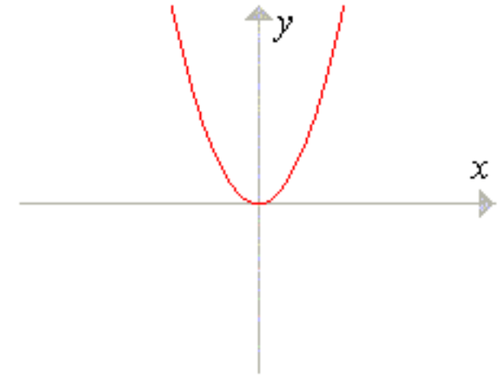
f :x ∈ R → f(x) = x^n ***n pari***

***A* = R** ***f(R)*= [0 , +∝[**

I =**[0, +∝[o I =] -∝, 0]**

$$\lim_{x\to x_o} x^n = x_o^n \quad \forall x_0 \in R$$

$$\lim_{x\to+\infty} x^n = \lim_{x\to-\infty} x^n = +\infty$$



Funzione potenza di esponente intero positivo dispari

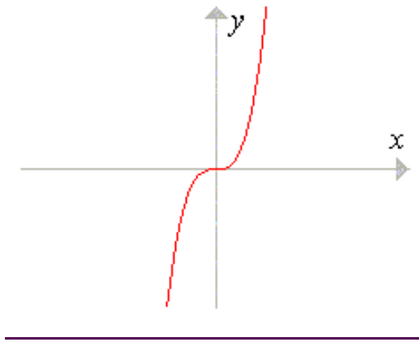
f :x ∈ R → f(x) = x^n ***n dispari***

A = **R** ***f(R)* = R**

I = **R**

$$\lim_{x\to x_o} x^n = x_o^n \quad \forall x_0 \in R$$

$$\lim_{x\to-\infty} x^n = -\infty \qquad \lim_{x\to+\infty} x^n = +\infty$$



Funzione radice n-sima n pari

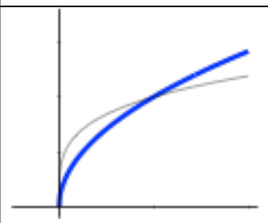
f :x ∈ [0 , +∝)→ f(x) = $\sqrt[n]{x}$ **n pari**

***A* = [0 , +∝)** ***f([0 , +∝[)*= [0 , +∝[**

***I* = [0 , +∝[**

$$\lim_{x\to x_o} \sqrt[n]{x} = \sqrt[n]{x_o} \quad \forall x_0 \in R$$

$$\lim_{x\to+\infty} \sqrt[n]{x} = +\infty$$



Funzione radice n-sima n dispari

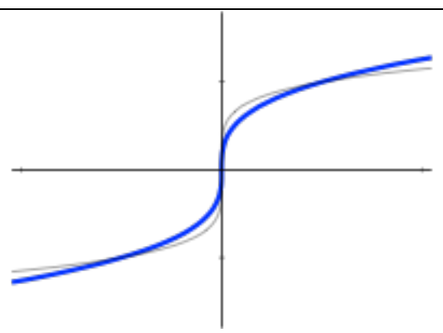
f :x ∈ R→ f(x) = $\sqrt[n]{x}$ **n dispari**

***A* = R** ***f(R)* = R**

***I* = R**

$$\lim_{x\to x_o} \sqrt[n]{x} = \sqrt[n]{x_o} \quad \forall x_0 \in R$$

$$\lim_{x\to-\infty} \sqrt[n]{x} = -\infty \qquad \lim_{x\to+\infty} \sqrt[n]{x} = +\infty$$



Funzione potenza con esponente intero negativo

f :x ∈ R-{0} → f(x) = $x^{-n}=1/x^n$

n dispari

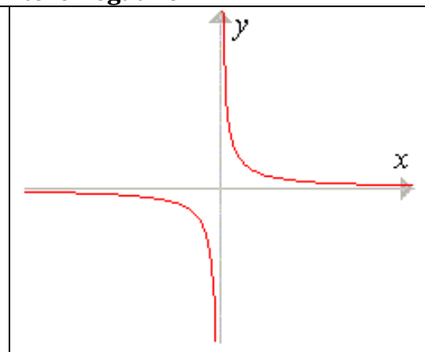
***A* = R - {0}** ***f(R- {0})*= R - {0}**

I =**]0, +∝[o I =] -∝, 0[**

$$\lim_{x\to x_o} f(x) = x_o^{-n} \quad \forall x_0 \in R-\{0\}$$

$$\lim_{x\to0^-} f(x) = -\infty \qquad \lim_{x\to0^+} f(x) = +\infty$$

$$\lim_{x\to+\infty} f(x) = \lim_{x\to-\infty} f(x) = 0$$



f :x ∈ R-{0} → f(x) = $x^{-n}=1/x^n$ **n pari**

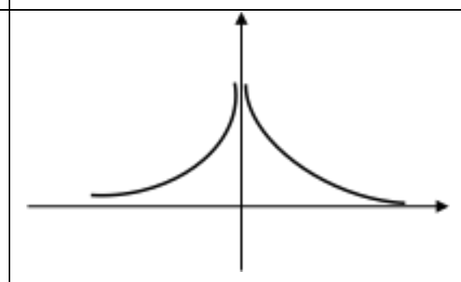
A = **R - {0}** ***f(R- {0})*=]0 , +∝)**

***I* =]0 , +∝[o I =] -∝, 0[**

$$\lim_{x\to x_o} f(x) = x_o^{-n} \quad \forall x_0 \in R-\{0\}$$

$$\lim_{x\to0} f(x) = +\infty$$

$$\lim_{x\to+\infty} f(x) = \lim_{x\to-\infty} f(x) = 0$$



SCHEMA FUNZIONI

Funzione esponenziale e funzioni logaritmo

Funzione esponenziale di base *a* >1

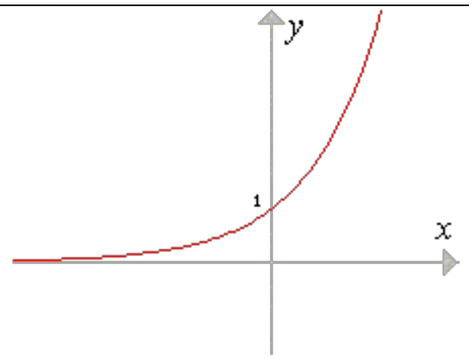
f :x ∈**R** → **f(x) = a^x , *a* > 1**

***A* = R** ***f(R)* =]0 , +∝[**

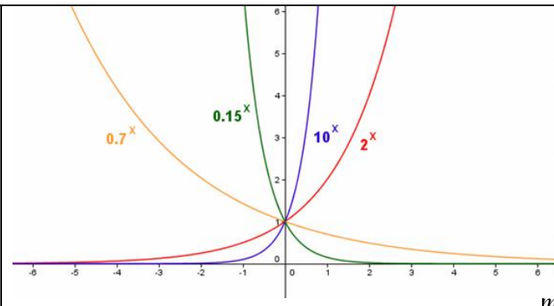
***I* = R**

$\lim_{x \to x_o} a^x = a^{x_0} \quad \forall x_0 \in R$

$\lim_{x \to -\infty} a^x = 0 \quad \lim_{x \to +\infty} a^x = +\infty$



→



Al crescere della base a >1 il grafico della funzione esponenziale si distacca dalla retta y=1 e cresce più rapidamente in [0, +∞[, mentre in]-∞, 0] cresce meno rapidamente e si avvicina sempre di più all'asse delle ascisse

l decrescere della base a <1 il grafico della funzion sponenziale si distacca dalla retta y=1 iventando più ripido in]-∞, 0], mentre in [0,+ ∞] e si avvicina sempre di più ll'asse delle ascisse

Funzione esponenziale di base *a* <1

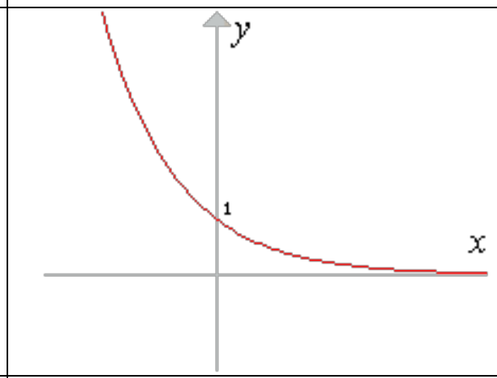
f :x ∈**R** → **f(x) = a^x ,** **0 < *a* < 1**

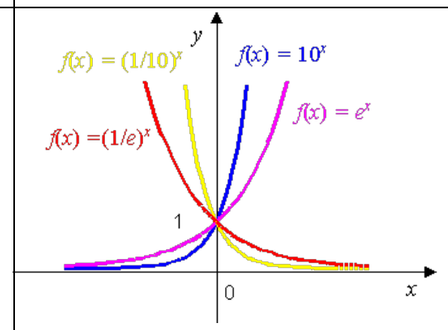
***A* = R** ***f(R)* =]0 , +∝[**

***I* = R**

$\lim_{x \to x_o} a^x = a^{x_0} \quad \forall x_0 \in R$

$\lim_{x \to -\infty} a^x = +\infty \quad \lim_{x \to +\infty} a^x = 0$





I grafici delle funzioni esponenziali di base

a e 1/a

sono simmetrici rispetto all'asse delle ordinate

Funzione logaritmica con *a* >1

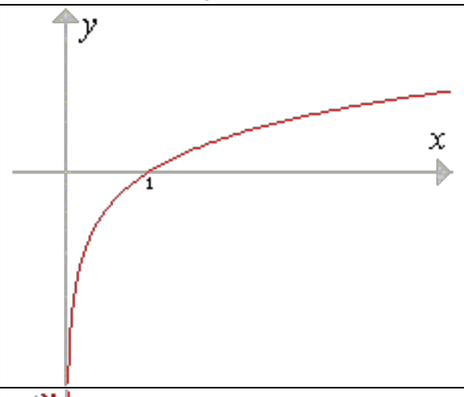
f :x ∈**]0 , +∝[→ f(x) = $\log_a x$, *a* > 1**

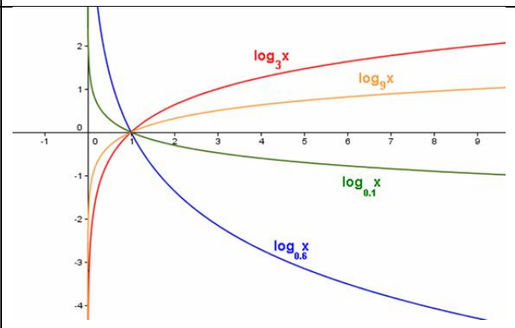
A=]0 , +∝[***f(*]0 , +∝[*)*= R**

I = **]0 , +∝[**

$\lim_{x \to x_o} \log_a x = \log_a x_0 \quad \forall x_0 \in]0, +\infty[$

$\lim_{x \to -\infty} \log_a x = 0 \quad \lim_{x \to +\infty} \log_a x = +\infty$





Funzione logaritmica con *a* <1

f :x ∈**]0 , +∝[→ f(x) = $\log_a x$,**

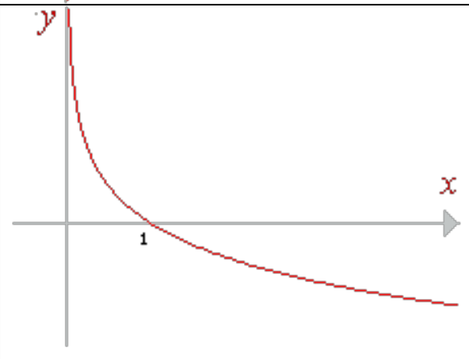
0<*a* <1

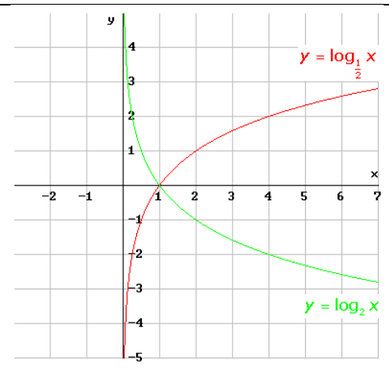
A=]0 , +∝[***f(*]0 , +∝[*)*= R**

I = **]0 , +∝[**

$\lim_{x \to x_o} \log_a x = \log_a x_0 \quad \forall x_0 \in]0, +\infty[$

$\lim_{x \to -\infty} \log_a x = +\infty \quad \lim_{x \to +\infty} \log_a x = 0$





I grafici delle funzioni logaritmo di base

a e 1/a

sono simmetrici rispetto all'asse delle ascisse

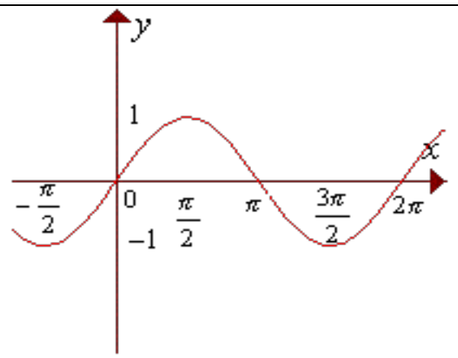
SCHEMA FUNZIONI

Funzioni trigonometriche

f :x ∈R → f(x) = senx

A = R ***f(R) = [-1 , 1]***

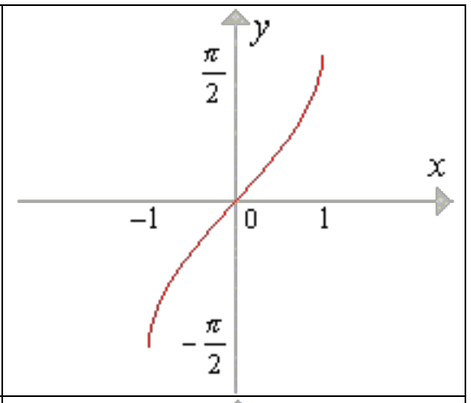
I= $\left[-\frac{\pi}{2}+k\pi,\frac{\pi}{2}+k\pi\right]$ ***k∈Z***



f :x ∈ [-1,1] → f(x) = arcsen x

A= [-1,1] **f([-1,1])=** $\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$

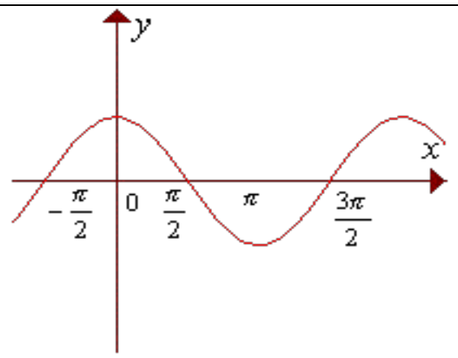
I= **[-1,1]**



f :x ∈R → f(x) = cosx

A = R ***f(R) = [-1 , 1]***

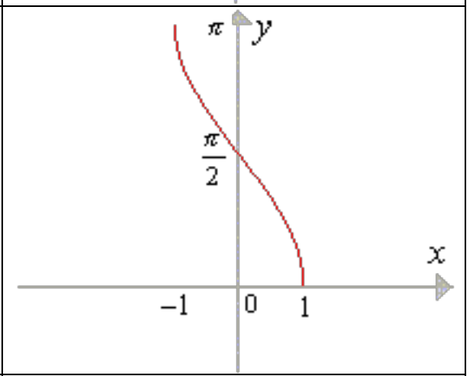
I= $\left[k\pi,\pi+k\pi\right]=\left[k\pi,(k+1)\pi\right]$ ***k∈Z***



f :x ∈ [-1,1] → f(x) = arccos x

A= [-1,1] **f([-1,1])=** $[0,\pi]$

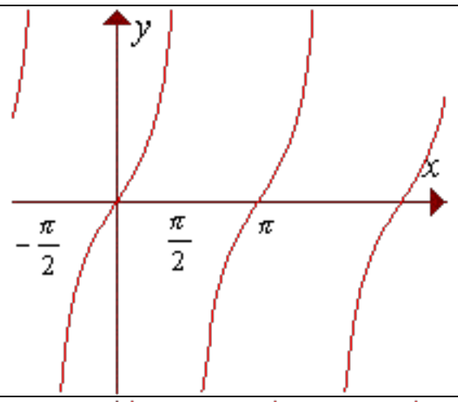
I= **[-1,1]**



f :x ∈A → f(x) = tg x

A $= R - \bigcup_{k\in Z}\left\{\frac{\pi}{2}+k\pi\right\}$ ***f (A)=R***

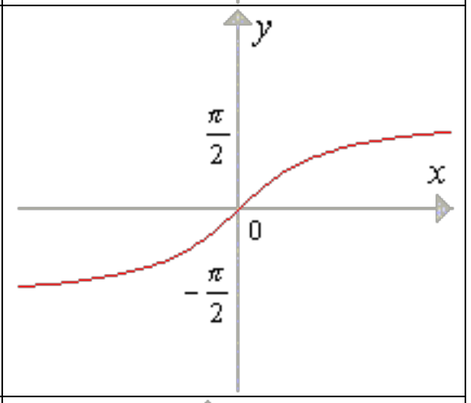
I= $\left]-\frac{\pi}{2}+k\pi,\frac{\pi}{2}+k\pi\right[$ ***k∈Z***



f :x ∈R → f(x) = arctg x

A= R **f(R)=** $\left]-\frac{\pi}{2},\frac{\pi}{2}\right[$

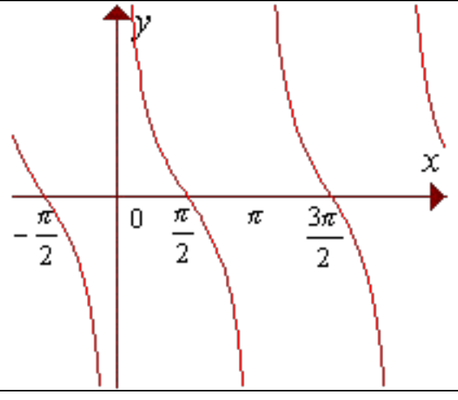
I= **R**



f :x ∈A → f(x) = ctg x

A $= R - \bigcup_{k\in Z}\{k\pi\}$ ***f (A)=R***

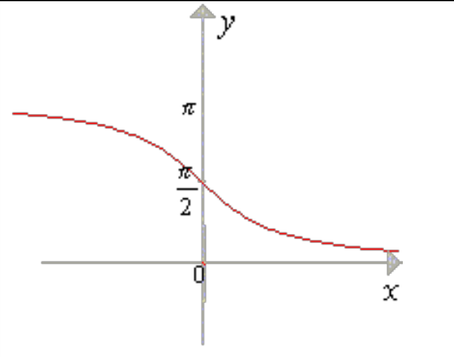
I= $]k\pi,\pi+k\pi[$ ***k∈Z***



f :x ∈R → f(x) = arccotg x

A= R **f(R)=** $]0,\pi[$

I= **R**



SCHEMA FUNZIONI