

Dominio } 2 funzioni sono uguali se queste 3 caratteristiche sono uguali  
 Codominio  
 Immagine

il dominio ha l'obbligo di far sì che ad ogni elemento del dominio si associi uno e un solo elemento del codominio, cioè non ci può essere un elemento del codominio a cui sono associate più immagini.

L'immagine sono i valori effettivamente presi

Il codominio invece è tutto quanto

L'insieme immagine è un sottoinsieme del codominio che contiene tutte le immagini degli elementi

insieme immagine = insieme di tutte le immagini di un elemento del dominio



Vediamo i domini delle varie funzioni

se il seno assume valori  $[-1, 1] \Rightarrow$  arc sen  $[-1, 1]$

$\operatorname{tg} = \frac{\operatorname{sen}}{\cos}$ , il cui in determinati punti vale 0 (es.  $\frac{\pi}{2}$ ), per questi valori la tg non è definita

se le radici è pari l'argomento è  $\geq 0$  se invece è gli spari è tutto  $\mathbb{R}$

le potenze hanno tutto  $\mathbb{R}$

le frazioni hanno denominatore  $\neq 0$

$$\text{es: } \log(1+x) \quad \begin{cases} x \geq 0 \\ 1+x > 0 \end{cases} \quad \dots$$

$$(x-1)(x-2) \neq 0$$

$$x \neq 1 \quad \wedge \quad x \neq 2$$

$$(x-1)(x-2) > 3$$

$$x^2 - 3x + 2$$

$$x^2 - 3x + 2 < 6$$

$$x^2 - 3x + 2 - 6 < 0$$

$$x^2 - 3x - 4 < 0$$

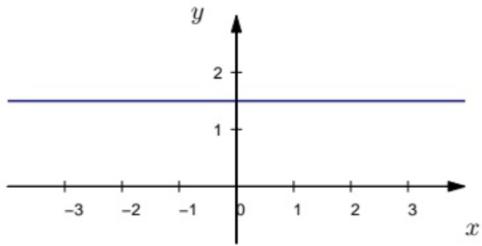
$$(x-1)(x-4) < 0$$

$$x-1 < 0 \Rightarrow x < 1$$

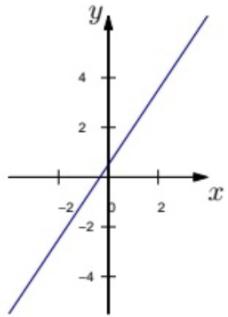
$$x-4 < 0 \Rightarrow x < 4$$

$$\frac{3 \pm \sqrt{9+16}}{2} = \frac{3 \pm \sqrt{25}}{2}$$
$$\frac{3+5}{2} = \frac{8}{2} = 4$$
$$\frac{3-5}{2} = \frac{-2}{2} = -1$$

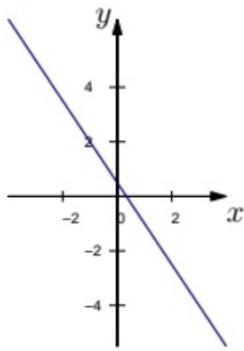
# GRAFICI DI FUNZIONI ELEMENTARI



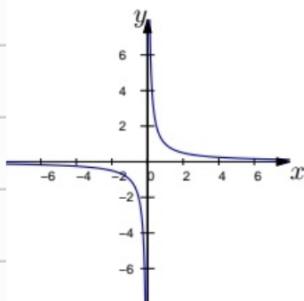
$$f(x) = c$$
$$\text{dom}(f) = \mathbb{R}$$



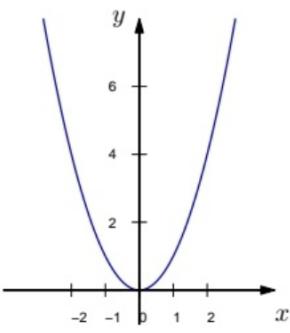
$$f(x) = ax + b$$
$$a > 0$$
$$\text{dom}(f) = \mathbb{R}$$



$$f(x) = ax + b$$
$$a < 0$$
$$\text{dom}(f) = \mathbb{R}$$

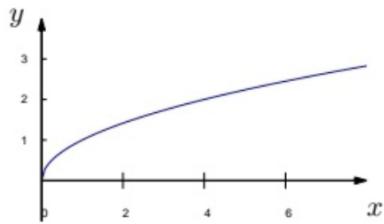


$$f(x) = \frac{1}{x}$$
$$\text{dom}(f) = \mathbb{R} \setminus \{0\}$$



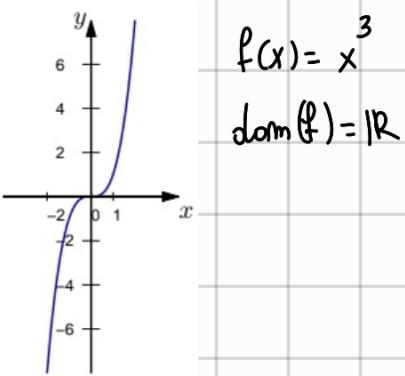
$$f(x) = x^2$$

$\text{dom}(f) = \mathbb{R}$



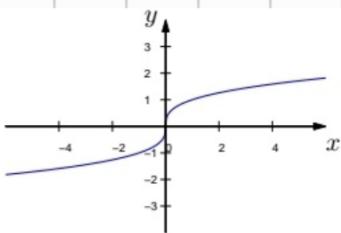
$$f(x) = \sqrt{x}$$

$\text{dom}(f) = [0, +\infty)$



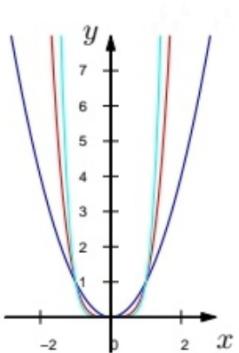
$$f(x) = x^3$$

$\text{dom}(f) = \mathbb{R}$



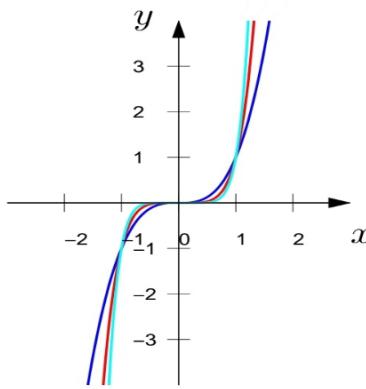
$$f(x) = \sqrt[3]{x} = x^{1/3}$$

$\text{dom}(f) = \mathbb{R}$



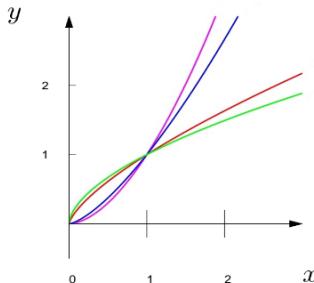
$$f(x) = x^m \text{ con } m \text{ pari}$$

$\text{dom}(f) = \mathbb{R}$



$$f(x) = x^m \text{ con } m \text{ dispari}$$

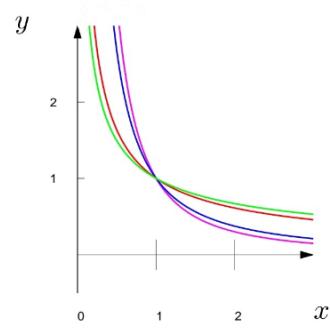
$$\text{dom}(f) = \mathbb{R}$$



Potenze con esponente reale positivo

$$f(x) = x^\alpha, \alpha > 0$$

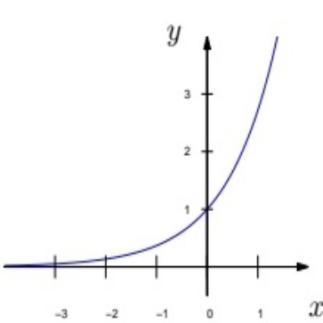
$$\text{dom}(f) = [0, +\infty)$$



Potenze con esponente reale negativo

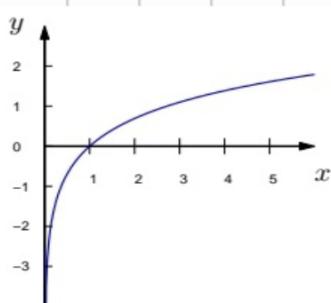
$$f(x) = x^\alpha, \alpha < 0$$

$$\text{dom}(f) = (0, +\infty)$$



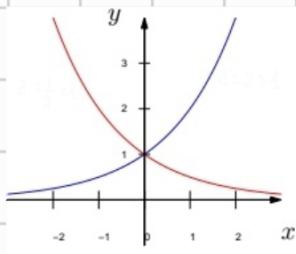
$$f(x) = e^x$$

$$\text{dom}(f) = \mathbb{R}$$



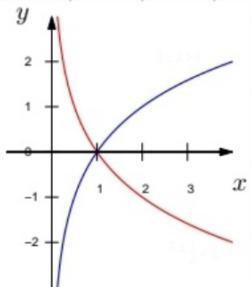
$$f(x) = \log_e x = \log x$$

$$\text{dom}(f) = (0, +\infty)$$



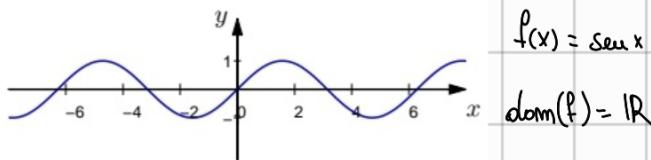
$$f(x) = a^x \text{ com } a > 0$$

$$\text{dom}(f) = \mathbb{R}$$



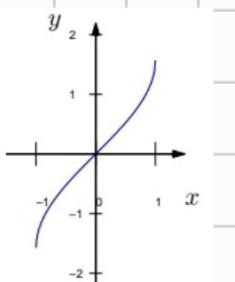
$$f(x) = \log_a x, \text{ com } a > 0, a \neq 1$$

$$\text{dom}(f) = (0, +\infty)$$



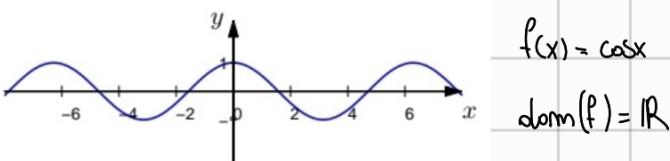
$$f(x) = \sin x$$

$$\text{dom}(f) = \mathbb{R}$$



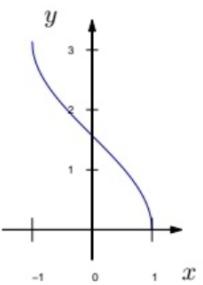
$$f(x) = \arcsin x$$

$$\text{dom}(f) = [-1, 1]$$



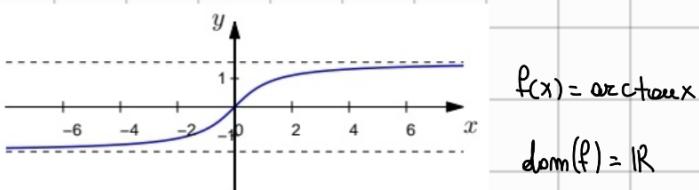
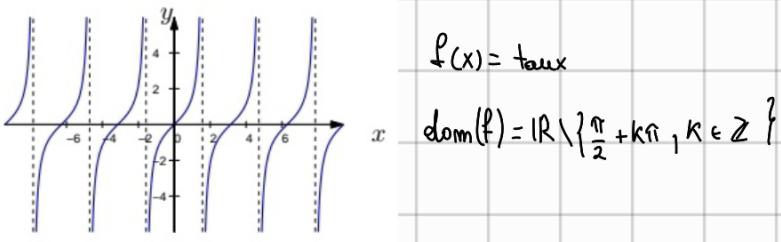
$$f(x) = \cos x$$

$$\text{dom}(f) = \mathbb{R}$$



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

$$\text{dom}(f) = [-1, 1]$$



## DISEQUAZIONI IRRAZIONALI

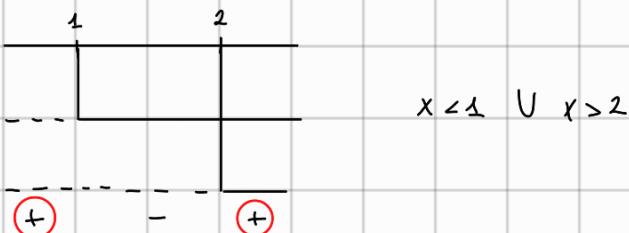
$$1) \sqrt{f} > \sqrt{g} \quad (\text{op. } \sqrt{f} \leq \sqrt{g}) \Rightarrow \begin{cases} f \geq 0 \\ g \geq 0 \\ f > g \end{cases} \quad (f > g)$$

$$2) \sqrt{f} > g \Rightarrow \begin{cases} g < 0 \\ f \geq 0 \end{cases} \cup \begin{cases} g \geq 0 \\ f \geq 0 \\ f > g^2 \end{cases}$$

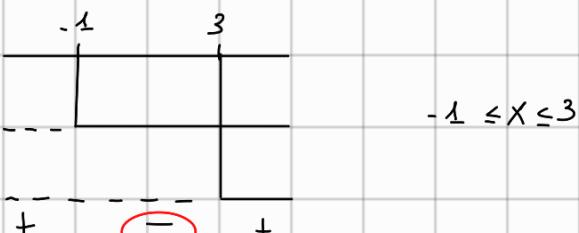
$$3) \sqrt{f} \leq g \Rightarrow \begin{cases} g \geq 0 \\ f \geq 0 \\ f \leq g^2 \end{cases}$$

COME DISEGNARE i GRAFICI NEI DOMINI

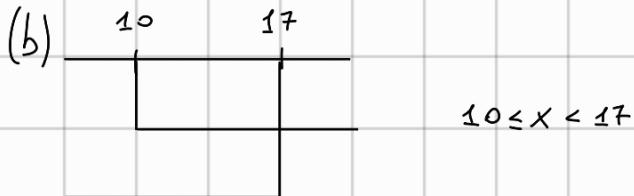
$$1) (x-1)(x-2) > 0$$



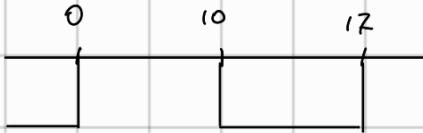
$$2) (x+1)(x-3) \leq 0$$



4) (c)  $\begin{cases} x < 2 \\ x \leq 0 \end{cases} \cup$  (b)  $\begin{cases} x \geq 10 \\ x < 17 \end{cases}$



Misco i due profili:



$$x \leq 0 \cup 10 \leq x < 17$$

$$5 \Rightarrow 3^{\log_3 5}$$

$$3^x > 5 \Rightarrow 3^x > 3^{\log_3 5} \Rightarrow x > \log_3 5$$