

# FUNZIONI

## Calcolo DOMINIO:

- 1) NELLA DIVISIONE: IL DENOMINATORE NON PUO' ESSERE 0
- 2) NELLA RADICE CON INDICE PARI IL RADICANDO NON PUO' ESSERE NEGATIVO
- 3) NEL LOGARITMO L'ARGOMENTO DEVE ESSERE  $> 0$
- 4) NELL'ELEVAMENTO A POTENZA CON ESPONENTE IRRAZIONALE, LA BASE DEVE ESSERE POSITIVA O NULLA SE L'ESPONENTE E' POSITIVO, STRETTAMENTE POSITIVA SE L'ESPONENTE E' NEGATIVO

## ESEMPLI:

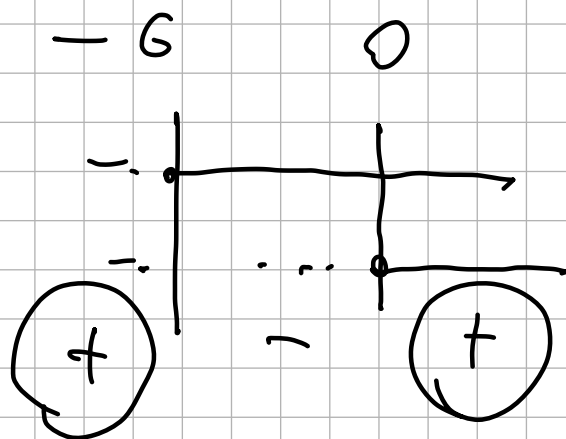
$$1) \quad y = 4 - \frac{x+2}{1-x^2}$$

$$\text{Dom}(y) = 1-x^2 \neq 0 \Rightarrow -x^2 \neq -1 \Rightarrow x \neq \pm 1$$
$$\mathbb{R} \setminus \{ \pm 1 \}$$

$$2) y = \sqrt{6x + x^2}$$

$$6x + x^2 \geq 0 \Rightarrow x(6 + x) \Rightarrow$$

$$x \geq 0 \quad x \geq -6$$



$$(-\infty, -6] \cup [0, \infty)$$

Domain

$$3) y = \sqrt[3]{\frac{6x + x^3}{x^2}}$$

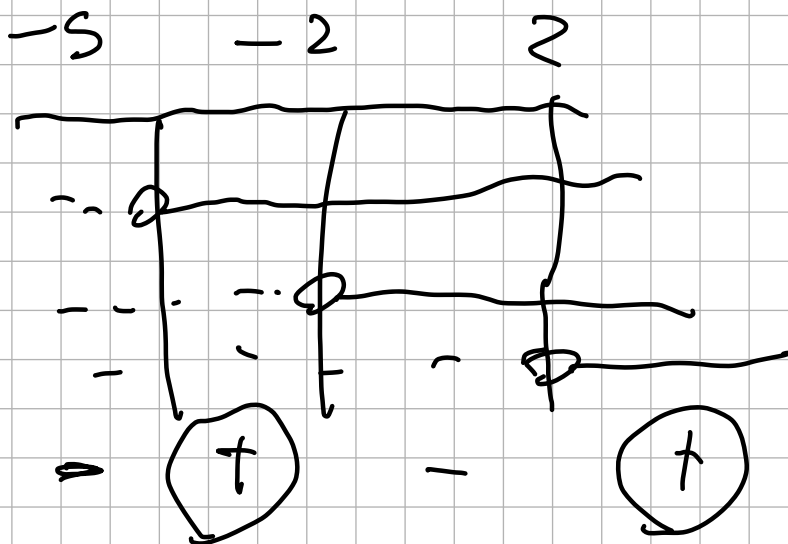
$$\text{Dom} = \mathbb{R} \setminus \{0\}$$

$$4) y = \ln\left(\frac{x^2 - 4}{6 + x}\right)$$

$$\frac{x^2 - 4}{5 + x} > 0$$

$$x + 5 > 0 \Rightarrow x > -5$$

$$x^2 - 4 > 0 \Rightarrow x^2 > 4 \Rightarrow x > \pm 2$$



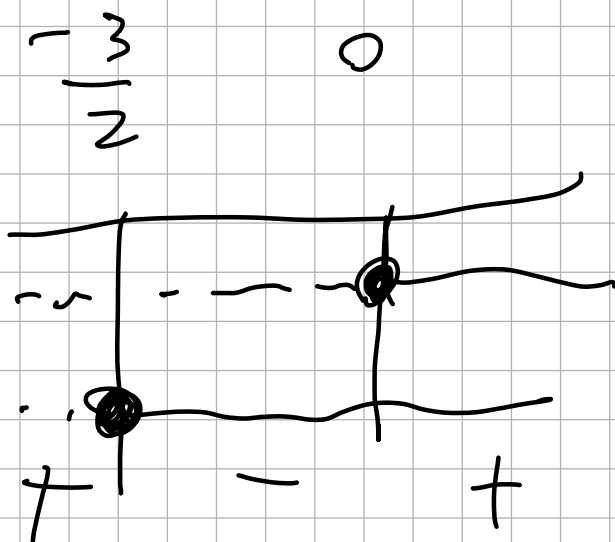
$$(-5, -2) \cup (2, +\infty)$$

$$5) y = 2 \sqrt{3x + 2x^2}$$

$$3x + 2x^2 \geq 0 \Rightarrow x(3 + 2x)$$

$$x \geq 0$$

$$\frac{2x}{2} \geq \frac{-3}{2} \Rightarrow x \geq -\frac{3}{2}$$



$$\left(-\infty, -\frac{3}{2}\right) \cup [0, +\infty)$$

$$6) \gamma: (3x-2)^{\sqrt{3}}$$

$$3x-2 \geq 0 \Rightarrow x \geq \frac{2}{3}$$

$$D = \left[\frac{2}{3}, +\infty\right)$$

$$7) \gamma: \ln |x^2 - 2x|$$

$$x^2 - 2x \neq 0 \Rightarrow x(x-2)$$

$$x \neq 0$$

$$x \neq 2$$

$$(-\infty, 0) \cup (0, 2) \cup (2, +\infty) = \mathbb{R} \setminus \{0, 2\}$$

$$8) y = 3 + \frac{7x + 2}{3 - x}$$

$$3 - x \neq 0 \Rightarrow -x \neq -3 \Rightarrow x \neq 3$$

$$\mathbb{R} \setminus \{3\}$$

$$9) y = x^2 - \frac{3x}{x^2 + 2} + \frac{5}{x - 1}$$

$$x^2 + 2 \neq 0 \Rightarrow x^2 \neq -2 \text{ SEMPRE VERIFICATO}$$

$$x \neq 1$$

$$\mathbb{R} \setminus \{1\}$$

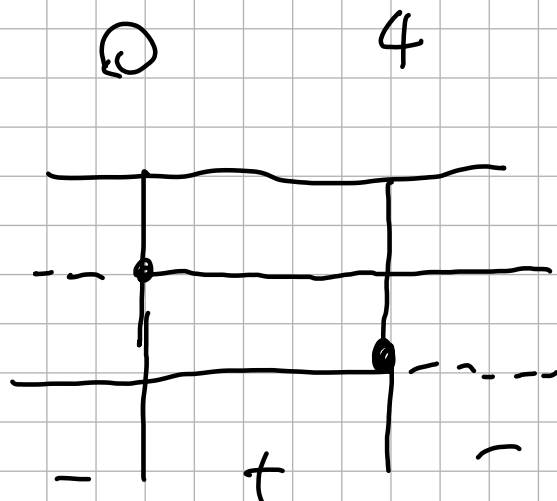
$$10) y = \sqrt{4x - x^2}$$

$$4x - x^2 \geq 0$$

$$x(4 - x)$$

$$x \geq 0$$

$$-x \geq -4 \Rightarrow x \leq 4$$



$$D = [0, 4]$$

$$11) y = \sqrt[5]{\frac{6+x}{x^2}}$$

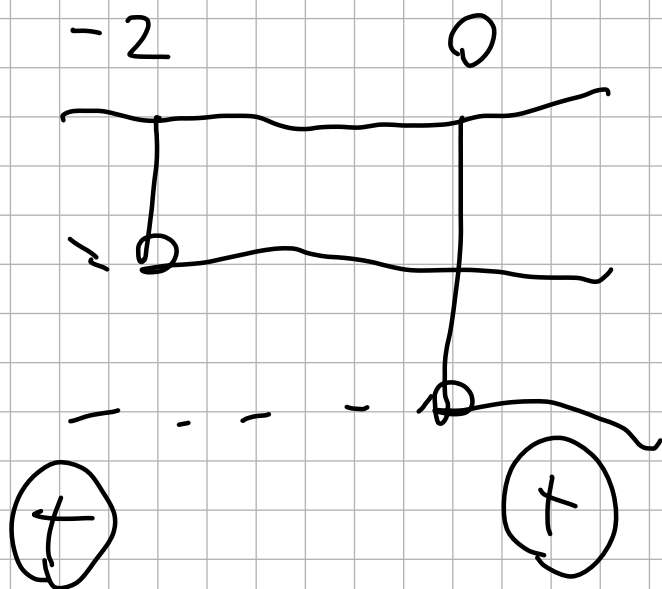
$$D = \mathbb{R} - \{0\}$$

$$12) \quad y = \frac{3-x}{\sqrt{2x+x^2}}$$

$$2x+x^2 \neq 0$$

$$x(2+x)$$

$$x \neq 0 \quad x \neq -2$$



$$D: (-\infty, -2) \cup (0, +\infty)$$

$$13) y = 2x - \sqrt{x^2 - 3}$$

$$\sqrt{2+x}$$

$$\sqrt{x^2 - 3} \geq 0$$

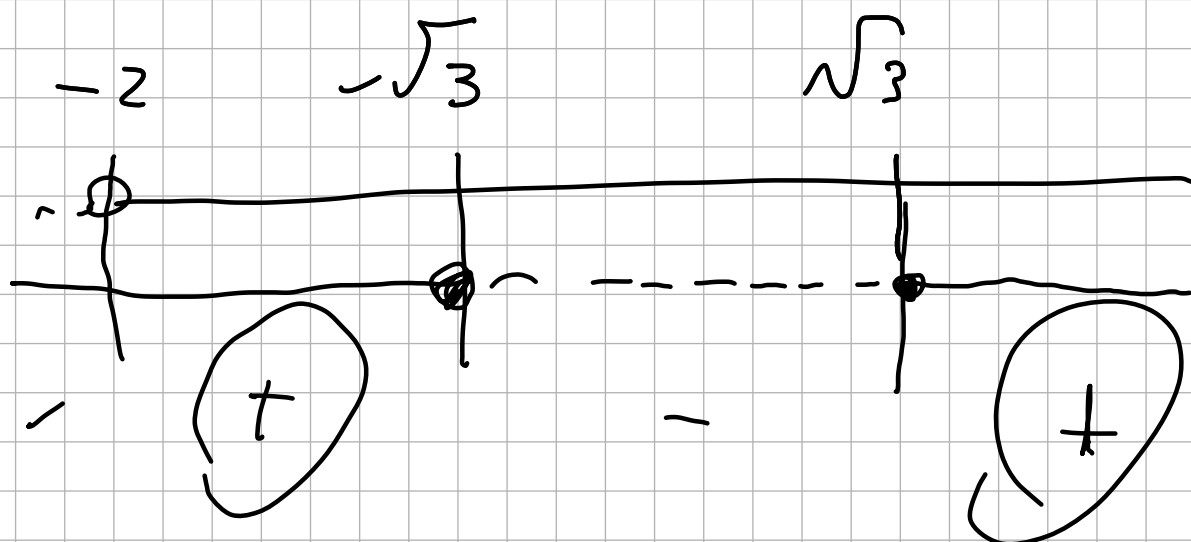
$$2+x \geq 0$$

$$x^2 \geq 3 \Rightarrow x \geq \pm \sqrt{3}$$

$$x \leq -\sqrt{3} \vee x \geq \sqrt{3}$$

$$x > -2$$





$$(-2, -\sqrt{3}) \cup [\sqrt{3}, +\infty)$$

Min. studio funzione

$$y = \begin{cases} 1+x & x < 0 \\ 2 & 0 \leq x < 3 \\ 3-x & x \geq 3 \end{cases}$$

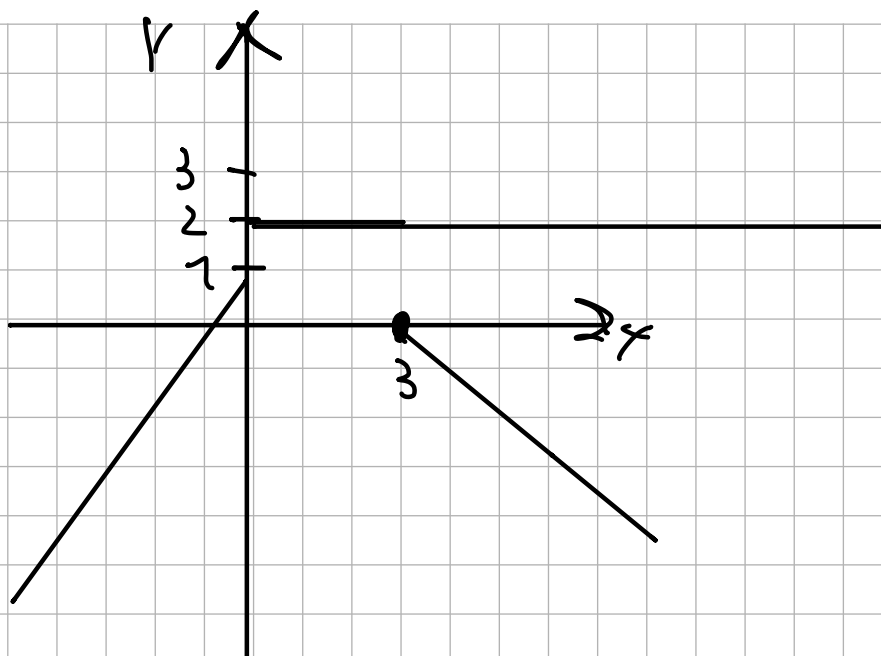
a) DISegnARE NEL PIANO CARTESIANO

b) INDICARE IL DOMINIO E L'INTEGRO DELLE  
IMMAGINI

c) L'INTEGRO DELLE IMMAGINI  $IM(f)$  E' LIMITATO?

d) L'INTEGRO IM HA MASSIMO?

2)



b)  $\text{Dom} = \mathbb{R}$

Per l'immagine:  $\mu$  (minimo) solo  $L_f$

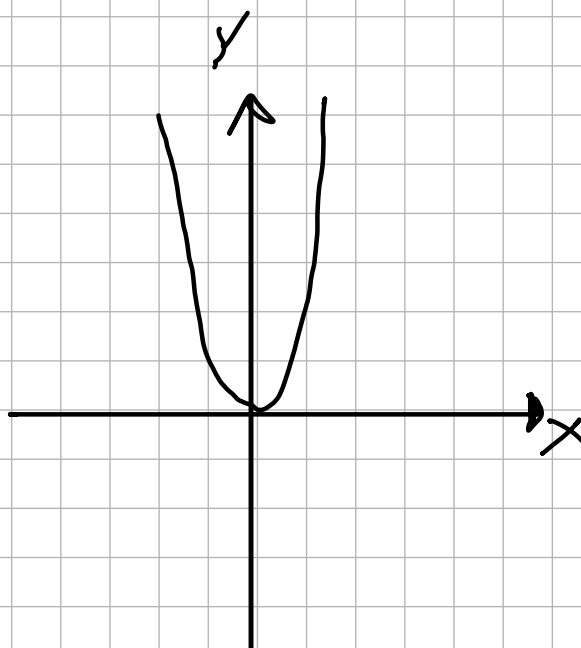
$\gamma$ , quindi  $\text{Im} = [-\infty, 1] \cup \{2\}$

c)  $\hat{G}$  solo limiti supremi e inferiori

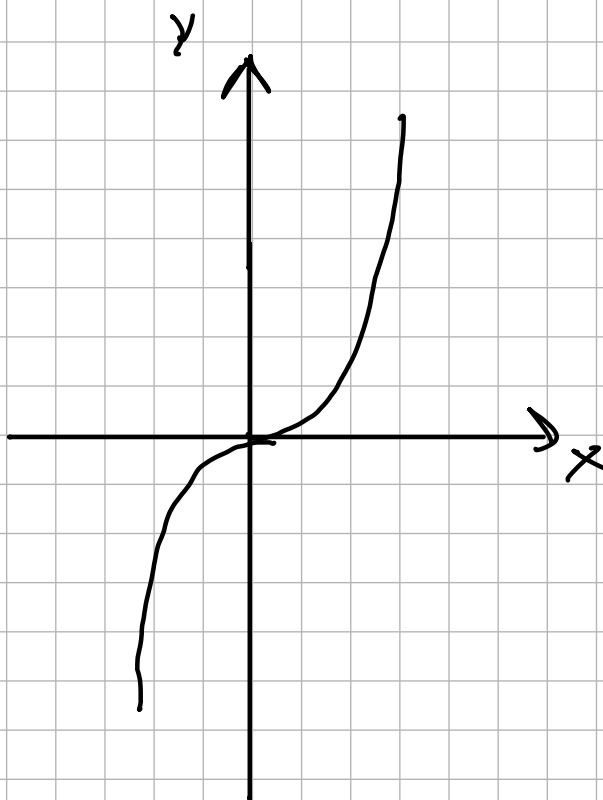
d)  $S_f$ , 2 massimo globale.

# GRAPHIC FUNCTION

1)  $y = x^4$



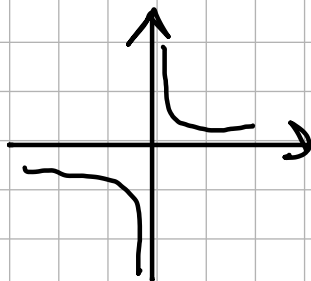
2)  $y = x^3$



3)  $y = \frac{1}{x^6}$

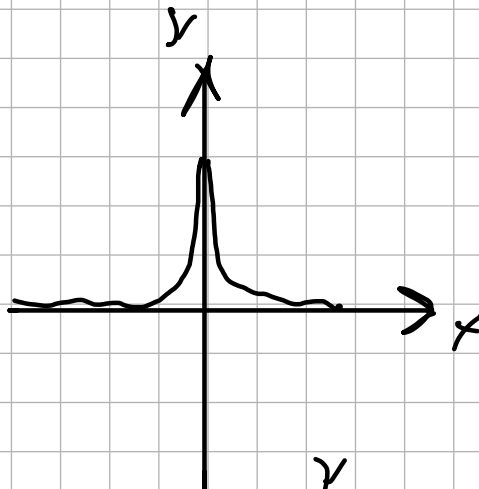
$\mathbb{R} - \{0\}$

$$\frac{1}{x}$$



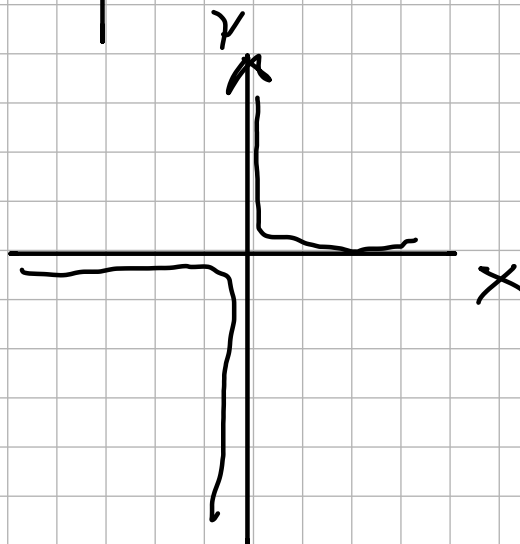
$$\frac{1}{x^m}$$

com  $m = \text{PAI}$

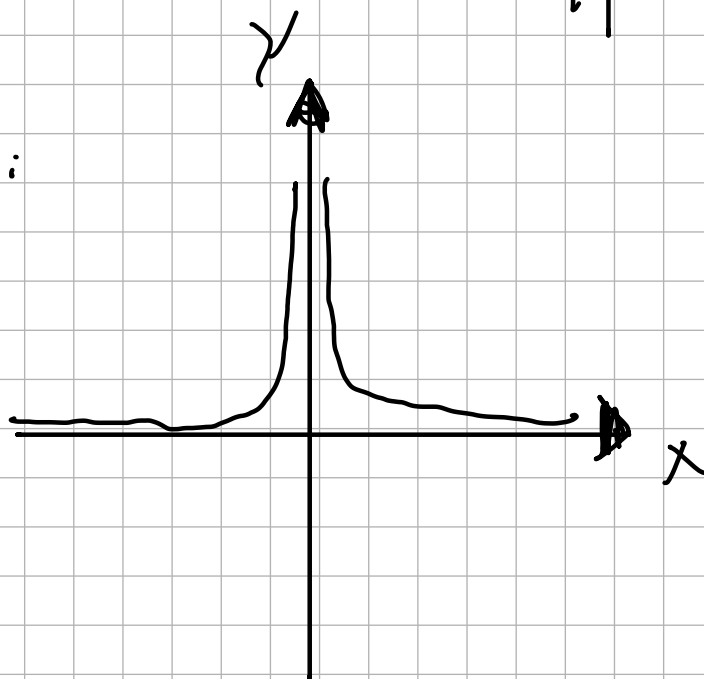


$$\frac{1}{x^m}$$

com  $m = \text{DISTAN}$



NEL NOSTRO CASO:



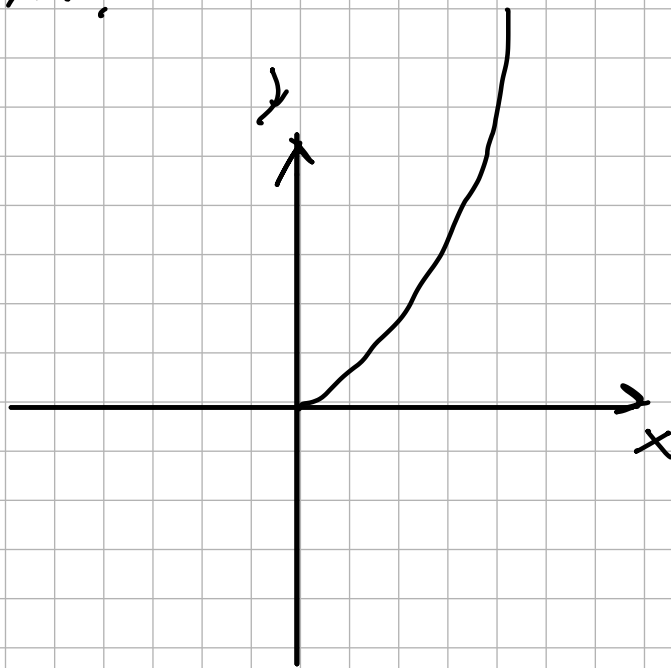
$$4) y = x^{\frac{3}{2}}$$

ESSENDO IL DENOMINATORE DELL'ESPOSANTE PIU' LA FUNZIONE ESISTE SOLO PER  $x \geq 0$ ;

ESSENDO  $\frac{3}{2} > 1$  LA FUNZIONE IN  $(0, 0)$

E' TANGENTE ALL'ASSIA DELLE  $x$  E IL CONTR.

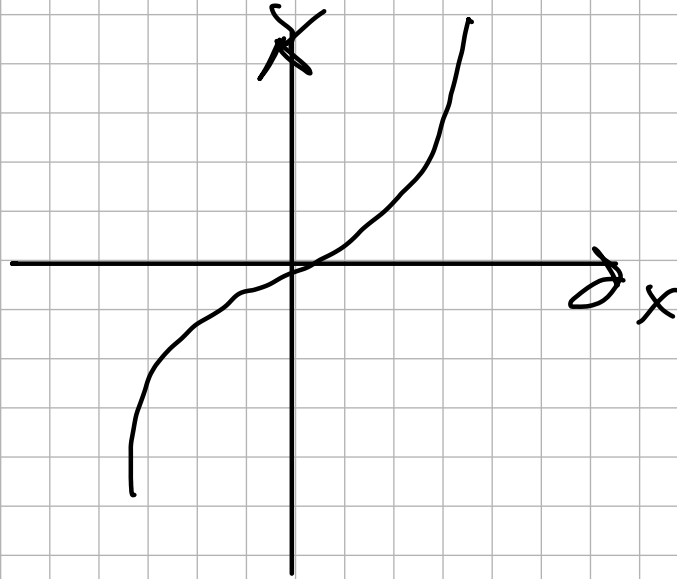
E' IL SEGMENTO:



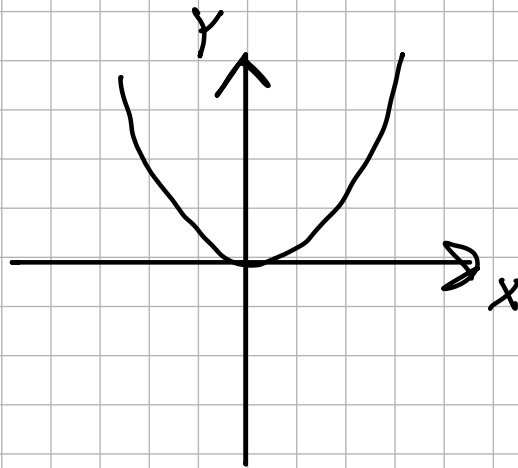
$$\text{dom} = [0, +\infty)$$

$$5) y = x^{\frac{1}{3}}$$

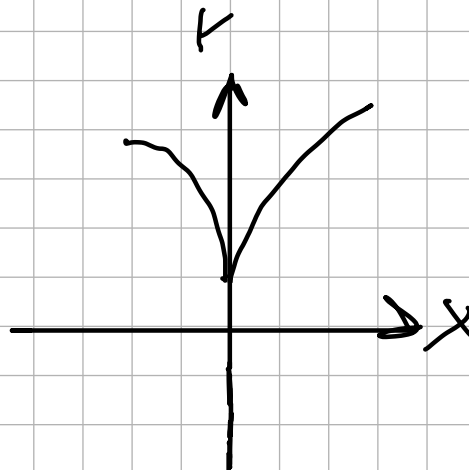
$$\text{Dom} = \mathbb{R}$$



$$6) y = x^{\frac{4}{3}}$$

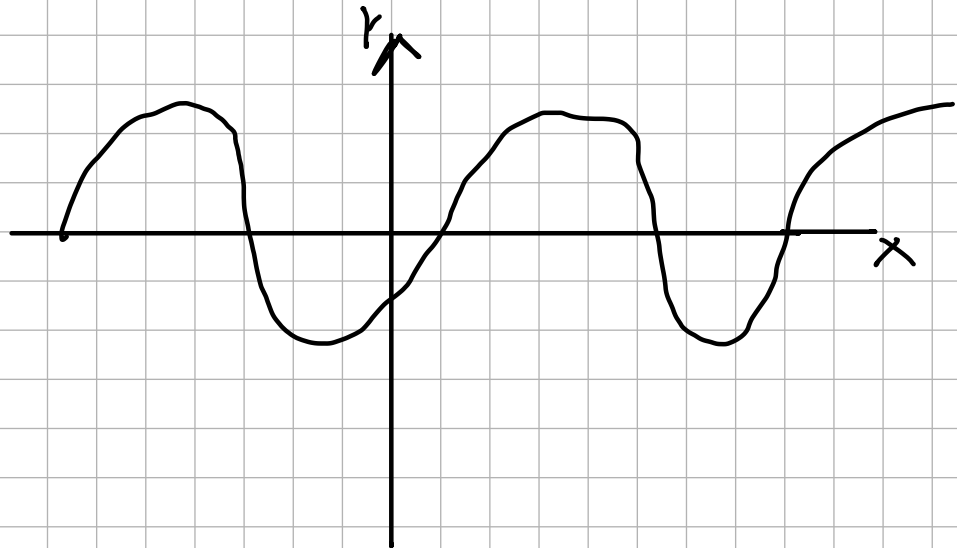


$$7) y = x^{\frac{2}{3}}$$



## Funzioni Goniometriche

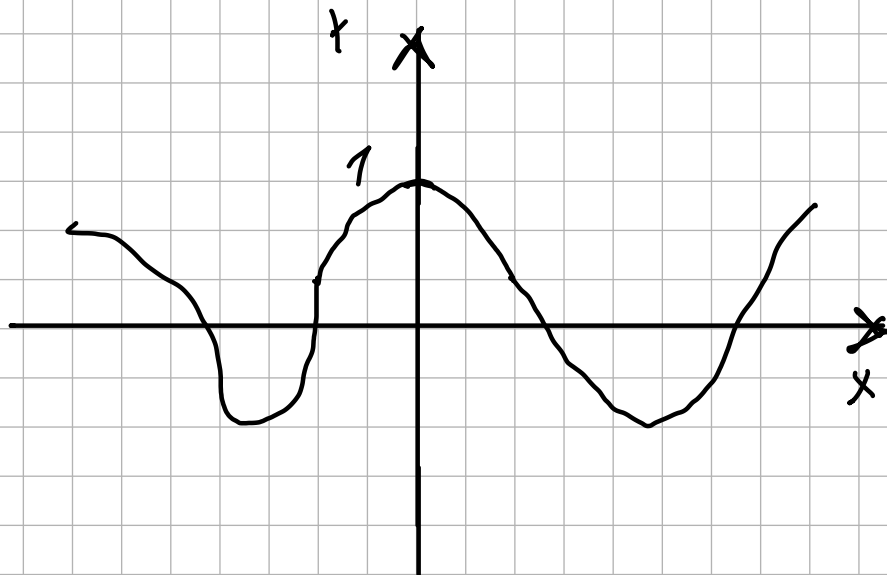
$y = \sin(x)$  Funzione periodica di periodo  $2\pi$



$$\text{Dom} = \mathbb{R}$$

$$\text{Im} = [-1, 1]$$

$y = \cos(x)$  Funzione periodica di periodo  $2\pi$



$$\text{Dom} = \mathbb{R}$$

$$\text{Im} = [-1, 1]$$