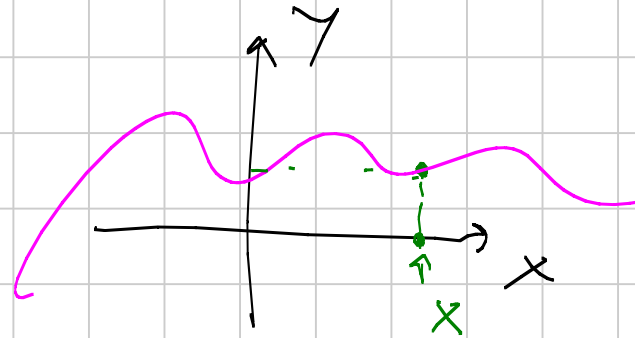


ANALISI 2 CIVILI

ORA 2

$$f: \mathbb{R} \rightarrow \mathbb{R}$$



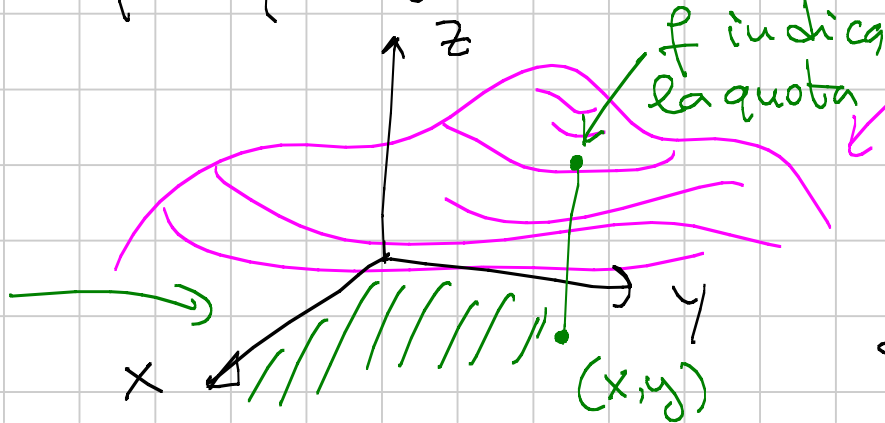
Asse x =
insieme di
partenza

$$\text{Grafico } f = \{ (x, y) \in \mathbb{R}^2 : y = f(x) \}$$

$$f: \mathbb{R}^2 \rightarrow \mathbb{R}$$

$$\text{Grafico di } f = \{ (x, y, z) \in \mathbb{R}^3 : z = f(x, y) \}$$

insieme di
partenza =
piano x, y



SUPERF.

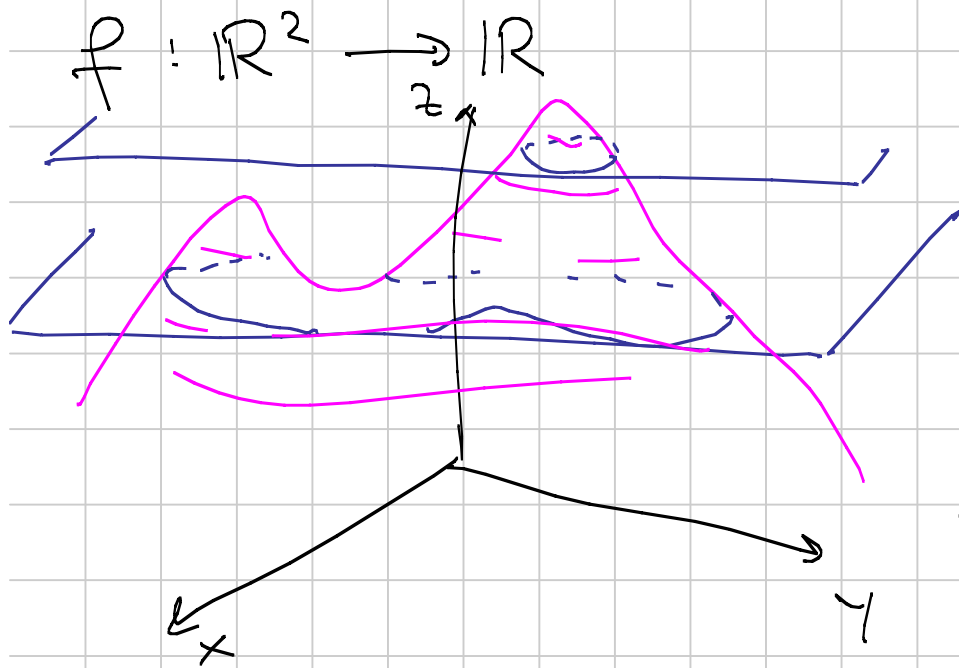
$f(x, y)$ indica
l'altezza della sup.
sopra il p.to (x, y)

$$f: \mathbb{R}^3 \rightarrow \mathbb{R}$$

Grafico di $f = \{(x, y, z, w) \in \mathbb{R}^4 : w = f(x, y, z)\}$

$$f: \mathbb{R}^n \rightarrow \mathbb{R}$$

Grafico di $f = \{(x_1, \dots, x_n, x_{n+1}) \in \mathbb{R}^{n+1} : x_{n+1} = f(x_1, \dots, x_n)\}$

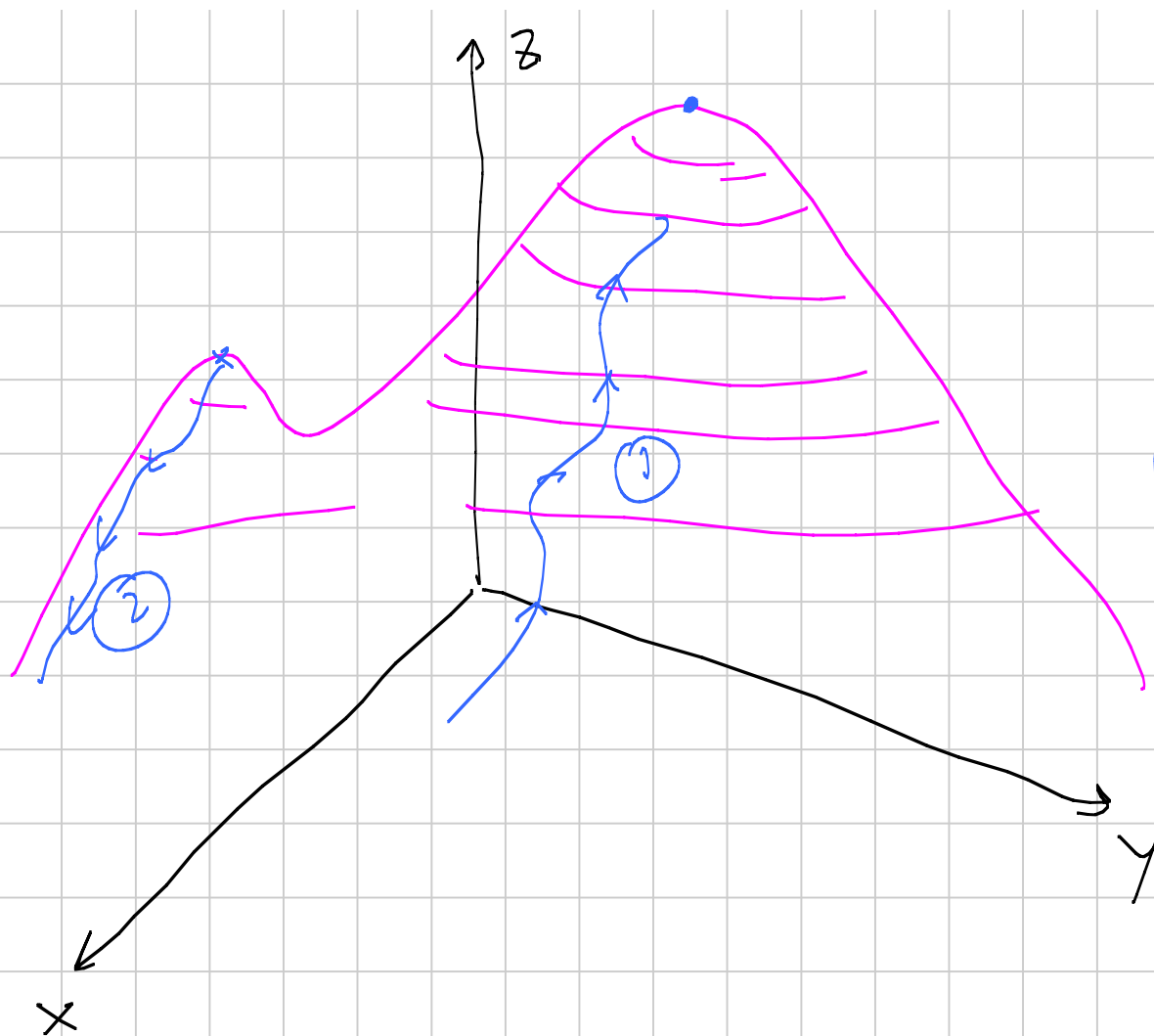


* linee di livello

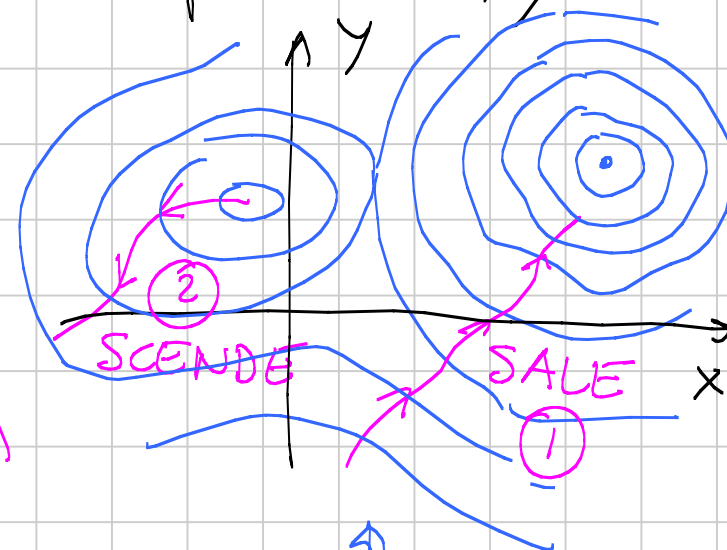
* restrizioni a
rette

LINEE LIVELLO

Fisso (altezza) $\lambda \in \mathbb{R}$ e
taglio con un piano ad
altezza λ parallelo a terra

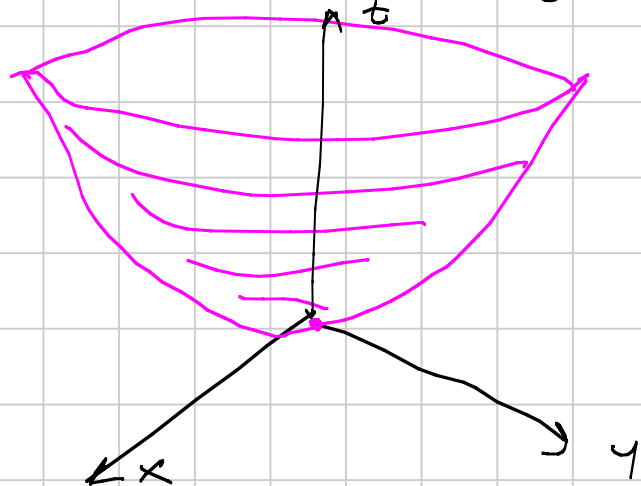


Le linee di livello
si rappresentano
nel piano x, y

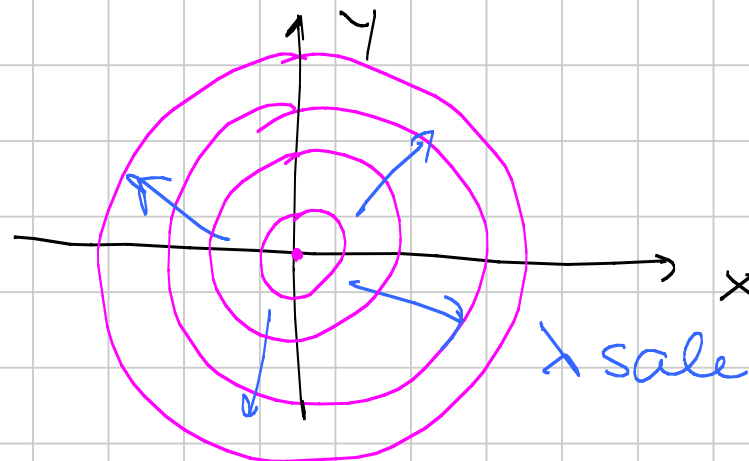


↑
linee di livello
(CARTA DEI
SENTIERI)

$$f(x,y) = x^2 + y^2$$



Linee di livello



Algebricamente: Fisso $\lambda \in \mathbb{R}$

$f(x,y) = \lambda \leftarrow$ cerco i p.ti $(x,y) \in \mathbb{R}^2$ in cui
la funzione vale λ

$\left\{ \begin{array}{l} x^2 + y^2 = \lambda \end{array} \right. \leftarrow$ circ. con centro in $(0,0)$ e raggio $\sqrt{\lambda}$

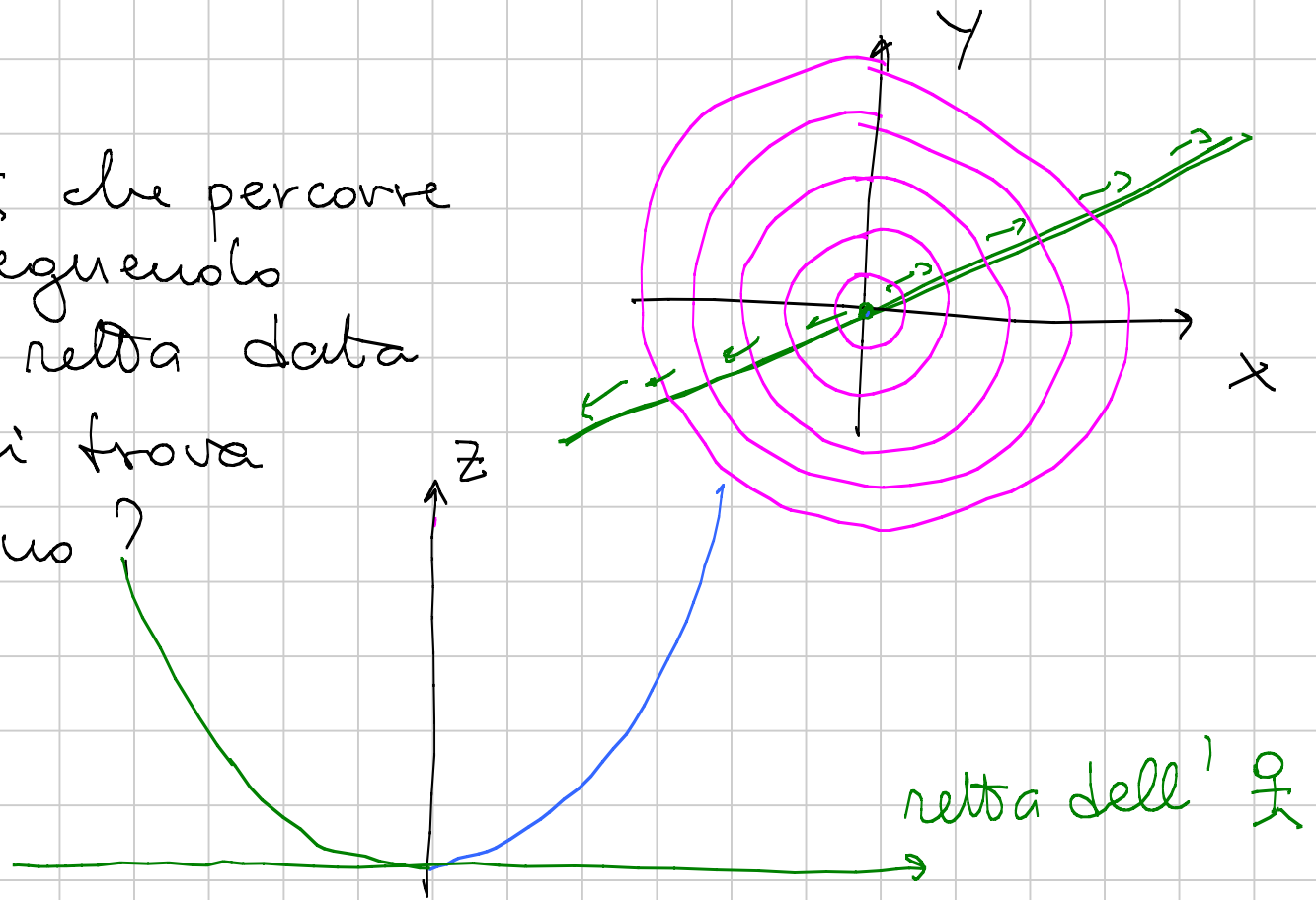
RESTRIZIONI A RETTE

$$f: \mathbb{R}^2 \rightarrow \mathbb{R}$$

Fisso una retta nell'insieme di partenza (piano x, y)

$$f(x, y) = x^2 + y^2$$

Penso ad un $\frac{0}{1}$ che percorre la montagna seguendo sulla cartina la retta data
A quale altezza si trova lungo il cammino?



Algebricamente: retta sia asse x

Equazione: $y=0$ → sostituisco
nella funzione

$$f(x, 0) = x^2$$

↑
messo $y=0$

Sia retta = asse y

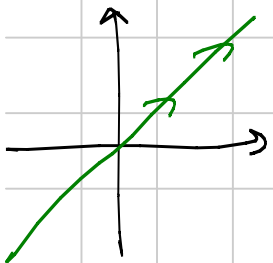
$$x=0$$

↓ sost.

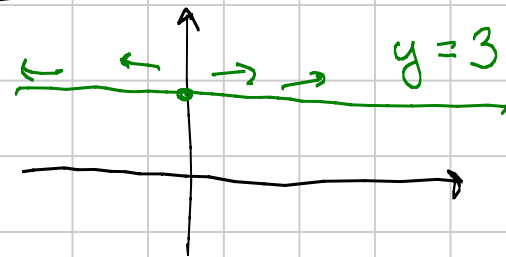
$$f(0, y) = y^2$$

retta = bisettrice

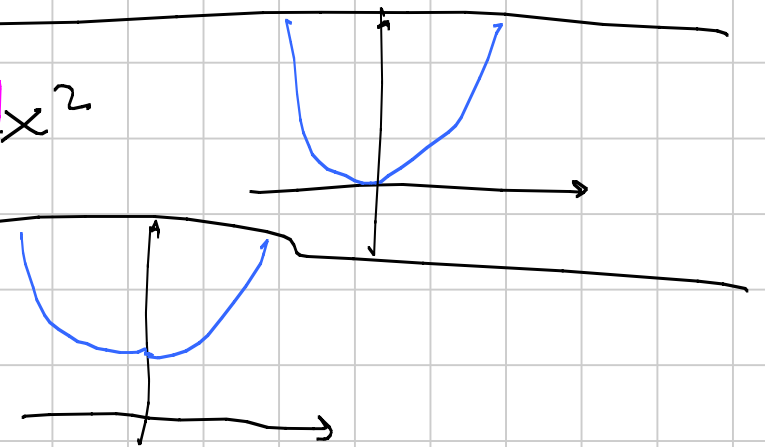
$$y=x$$



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



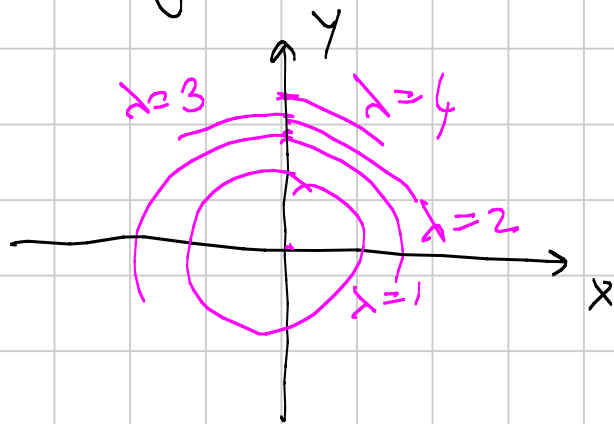
$$f(x, 3) = x^2 + 9$$



Esempio 2 $f(x,y) = \sqrt{x^2+y^2}$

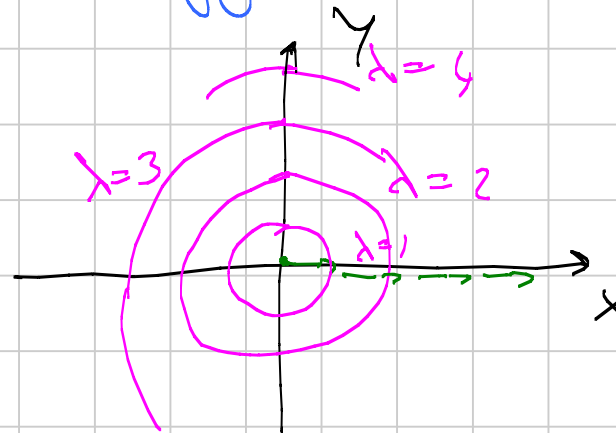
Linee di livello $f(x,y) = \lambda ; \sqrt{x^2+y^2} = \lambda \geq 0$

$x^2+y^2 = \lambda^2 \leftarrow$ circ. centro in $(0,0)$ e raggio λ .



PRIMA

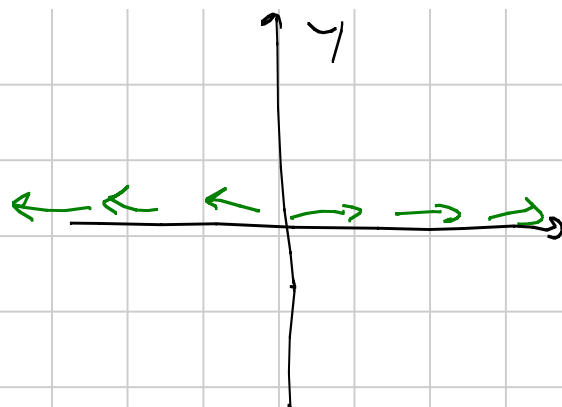
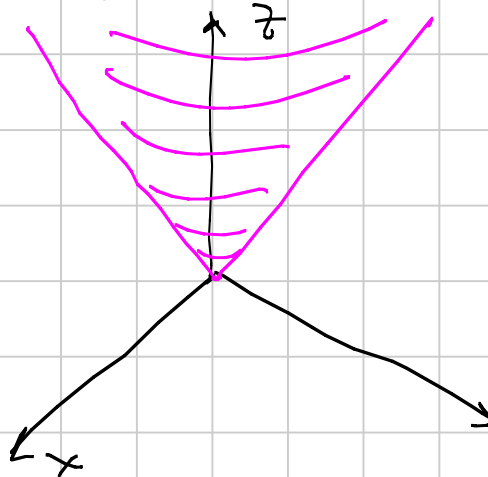
raggio = $\sqrt{\lambda}$



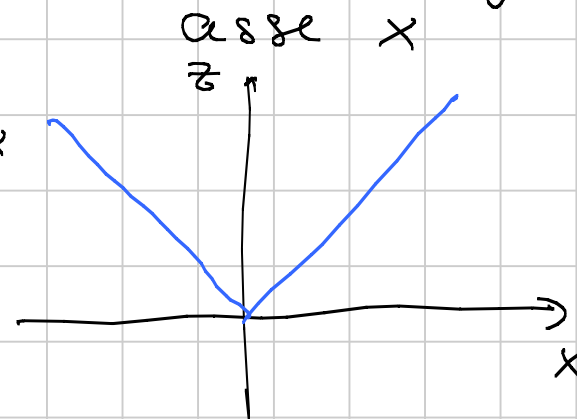
ORA

raggio = λ

Grafico di $\sqrt{x^2+y^2}$

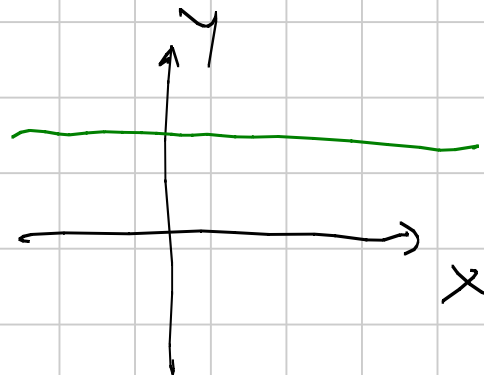
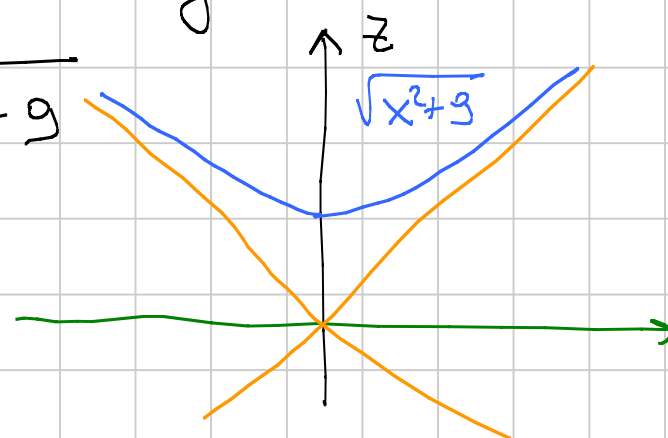


omnis lungo
asse x

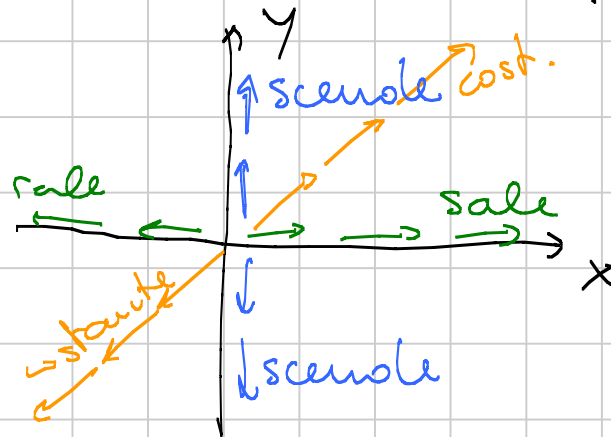


Omnis lungo retta $y=3$

Alg. $f(x,3) = \sqrt{x^2+9}$



Esempio 3



$$f(x, y) = x^2 - y^2$$

onius asse x

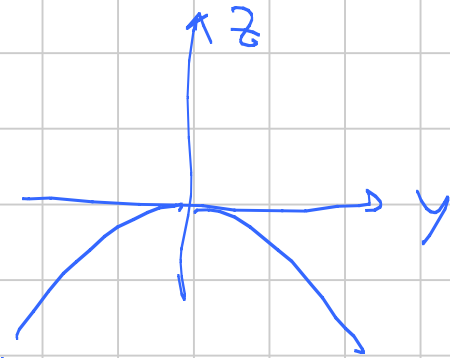
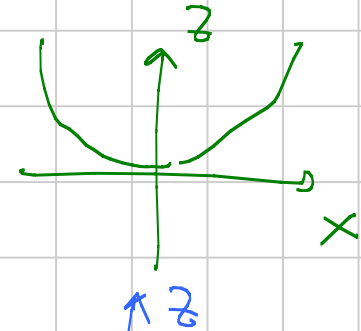
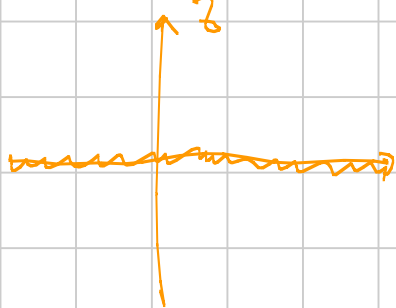
$$f(x, 0) = x^2$$

onius asse y

$$f(0, y) = -y^2$$

onius bisettrice $y = x$

$$f(x, x) = 0$$



MOUNTAIN
PASS

