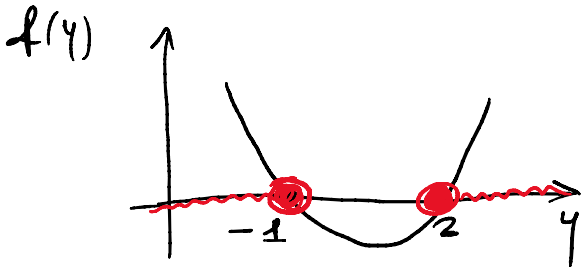
martedì 14 marzo 2023 08:47

$$z = \sqrt{9 - (x^2 + y^2)} + \sqrt{y^2 - y - 2}$$

$$\begin{cases} 9 - (x^2 + y^2) \geq 0 \\ y^2 - y - 2 \geq 0 \end{cases}$$

$$y^2 - y - 2 \geq 0$$

$$\Delta = (-1)^2 - 4 \cdot 1 \cdot (-2) = 1 + 8 = 9 > 0$$



$$y_{1,2} = \frac{1 \pm \sqrt{9}}{2} = \frac{1 \pm 3}{2} \begin{cases} 2 \\ -1 \end{cases}$$

$$y \leq -1 \quad \vee \quad y \geq 2$$

$$9 - (x^2 + y^2) \geq 0$$

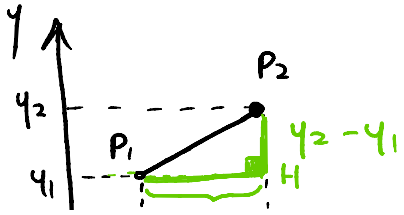
$$9 \geq x^2 + y^2$$

$$x^2 + y^2 \leq 9$$

$$x^2 + y^2 \leq 3^2$$

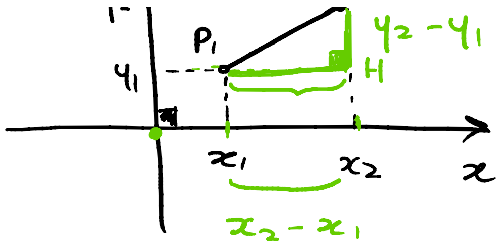
$$\boxed{x^2 + y^2 = 3^2}$$

circle with center the origin and radius 3



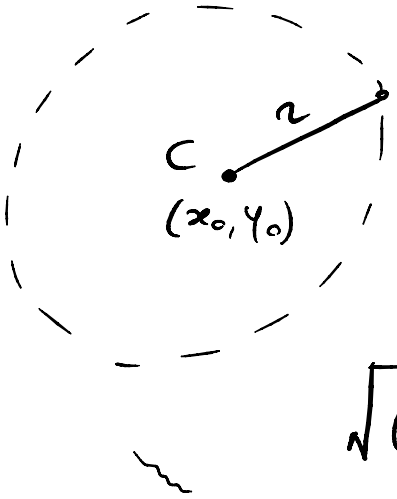
$$P_1 = (x_1, y_1)$$

$$P_2 = (x_2, y_2)$$



$P_2 = (x_2, y_2)$

$$d(P_1, P_2) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



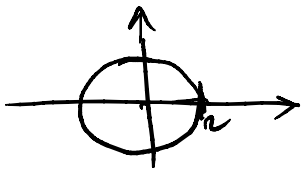
$$d(P, C) = r$$

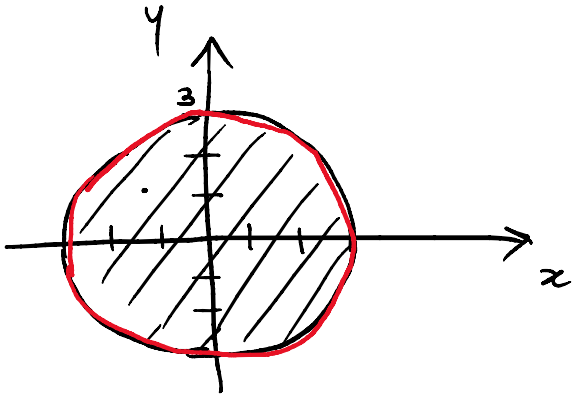
$$\sqrt{(x - x_0)^2 + (y - y_0)^2} = r$$

$$(x - x_0)^2 + (y - y_0)^2 = r^2$$

$x_0 = y_0 = 0$ the center is the origin

$$x^2 + y^2 = r^2$$

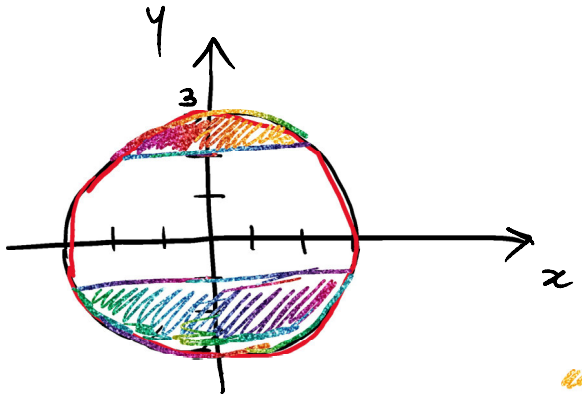




$$x^2 + y^2 \leq 3^2$$

$$0^2 + 0^2 \leq 9$$

$$0 \leq 9$$



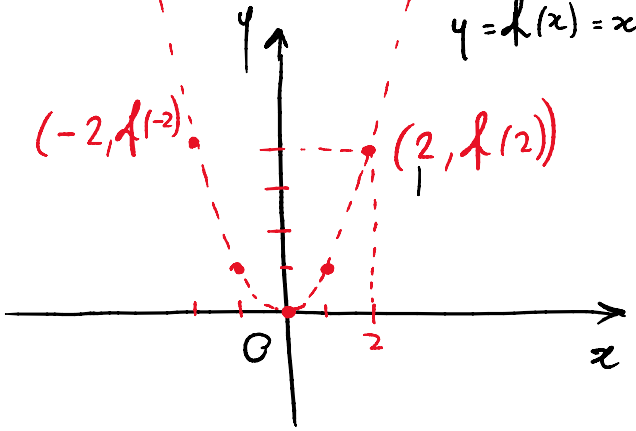
$y \leq -1 \quad \vee \quad y \geq 2$

our final domain

∞

$y = x^2$

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



$x = 0 \quad y = 0 = f(0)$

$x = 1 \quad y = 1 = f(1)$

$x = -1 \quad y = 1 = f(-1)$

$x = 2 \quad y = 4 = f(2)$

$x = -2 \quad y = 4 = f(-2)$

domain of f

Graph $f = \{(x, f(x)) : x \in A\}$

for functions $f : A \subseteq \mathbb{R} \longrightarrow \mathbb{R}$

for functions $f : A \subseteq \mathbb{R}^n \longrightarrow \mathbb{R}$

Graph $f = \{(\underline{x}, f(\underline{x})) : \underline{x} \in A\}$

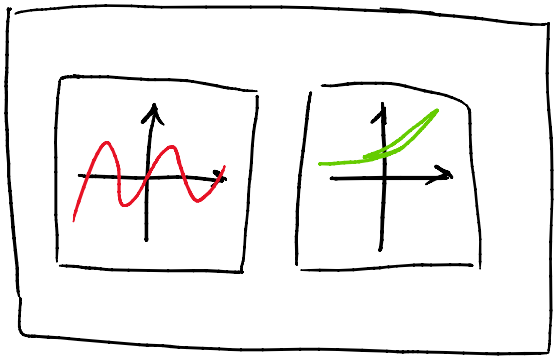
$y = \sqrt{x^2 - 1}$

$x^2 - 1 \geq 0$

$x \leq -1 \quad \vee \quad x \geq 1$

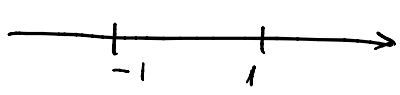
linspace (-2, 2, 1000)

2 m

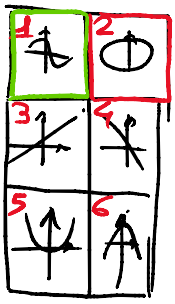


1

m



subplot (m, n, p)



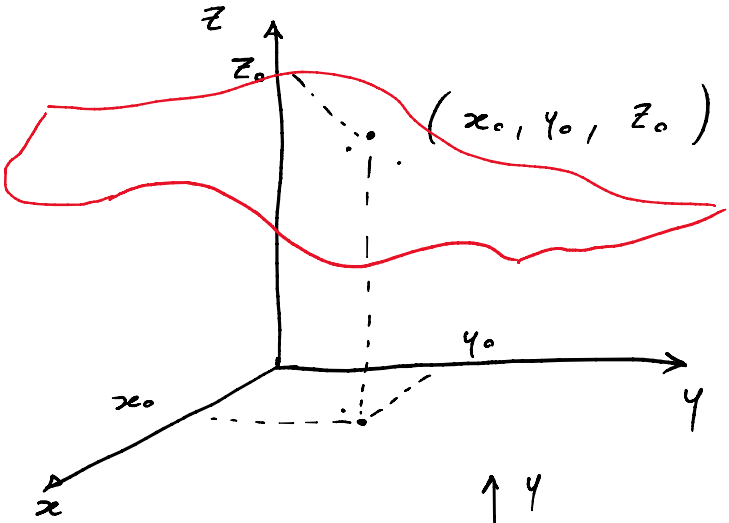
m = 3

n = 2

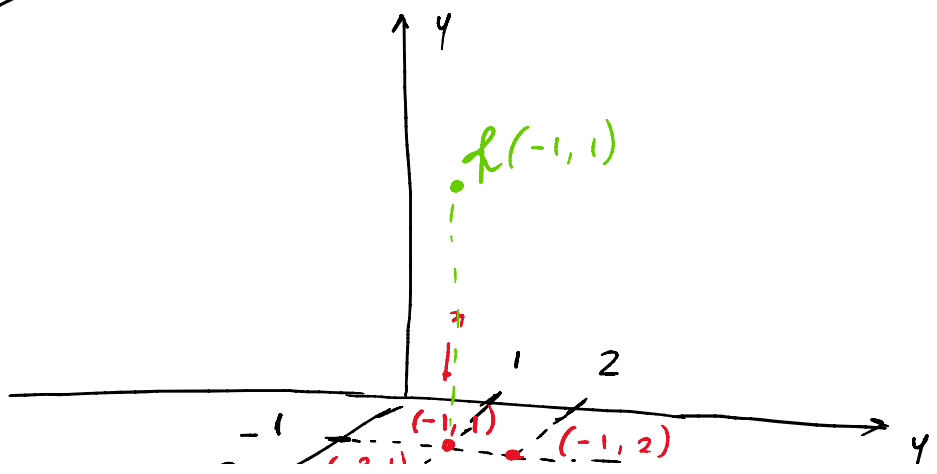
figure

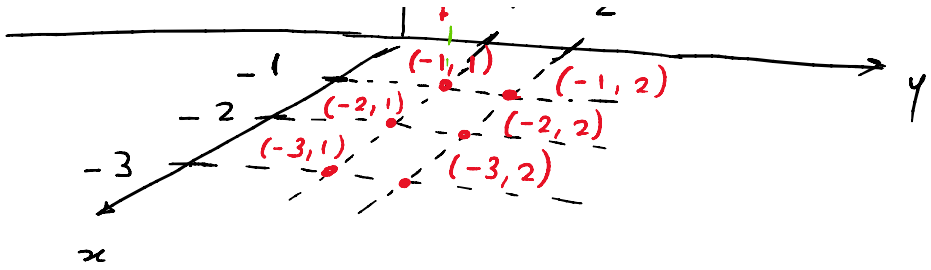
subplot (3, 2, 1)

subplot (3, 2, 2)



$z_0 = f(x_0, y_0)$




-1
-2
-3
(-1, 1)
(-1, 2)
(-2, 1)
(-2, 2)
(-3, 1)
(-3, 2)
y
x