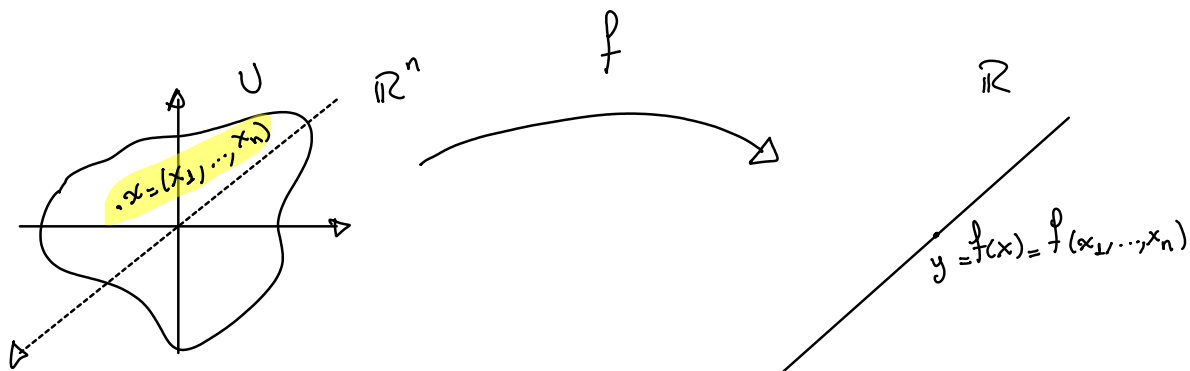


Funciones de varias variables

lunes, 26 de abril de 2021 07:03



$$\text{Dom} f = U$$

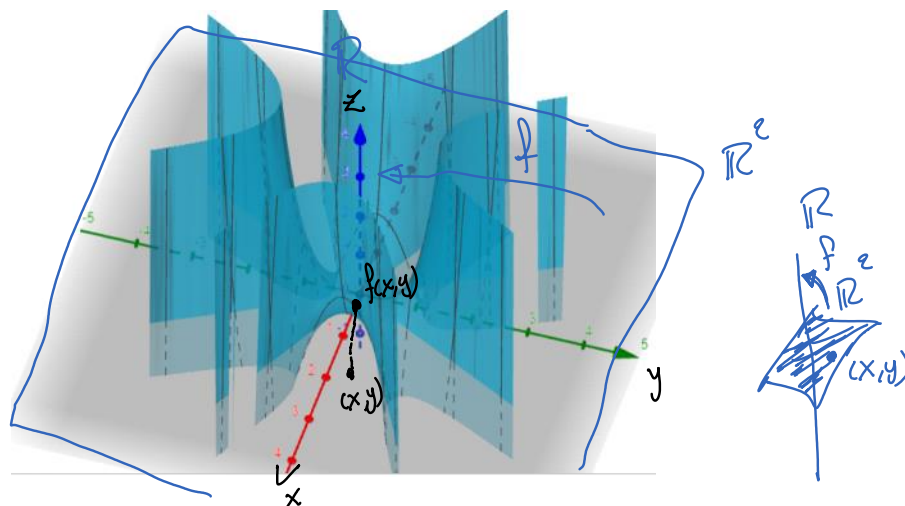
$$\text{Rang} f = \{y \in \mathbb{R} : y = f(x_1, \dots, x_n) \text{ para algùn } x = (x_1, \dots, x_n) \in U\}$$

Ejemplos:

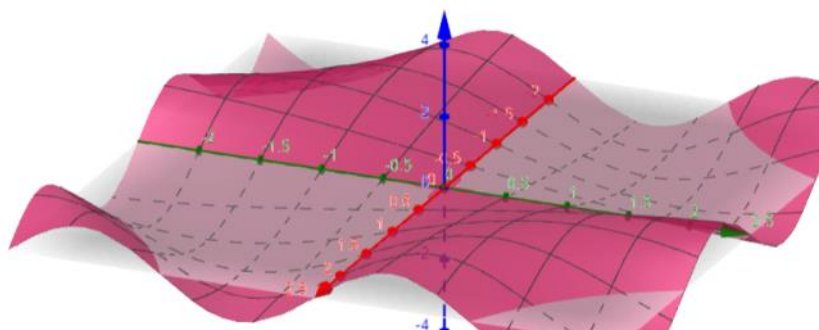
1. $f: \mathbb{R}^2 \rightarrow \mathbb{R}$ definida por $f(x, y) = x^4 + y^4 - 4x^2y^2$

$$\text{Dom} f = \mathbb{R}^2$$

$$\text{Rang} f = \mathbb{R}$$



2. $g: \mathbb{R}^2 \rightarrow \mathbb{R}$ definida por $g(x, y) = \sin(xy)$



$$\text{Dom} g = \mathbb{R}^2$$

$$\text{Rang} g = [-1, 1]$$

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Halle el dominio de la función $z = f(x, y)$ y representelo en el plano xy .

(b) $f(x, y) = \sqrt{x+y} + \sqrt{x-y}$

$y = -x$ $y = x$

Halle el dominio de la función $z = f(x, y)$

⑥ $f(x, y) = \sqrt{x+y} + \sqrt{x-y}$

Domf: $x+y \geq 0 \quad \wedge \quad x-y \geq 0$
 $x \geq -y$ ① $x \geq y$ ②

① $x \geq -y$
 $\cdot x = -y$
 $\cdot 1 \geq -1 \checkmark$

② $x \geq y$
 $\cdot x = y$
 $\cdot -1 \geq 1 \text{ F}$

Domf = $\{(x, y) \in \mathbb{R}^2 : x \geq -y \wedge x \leq y\}$

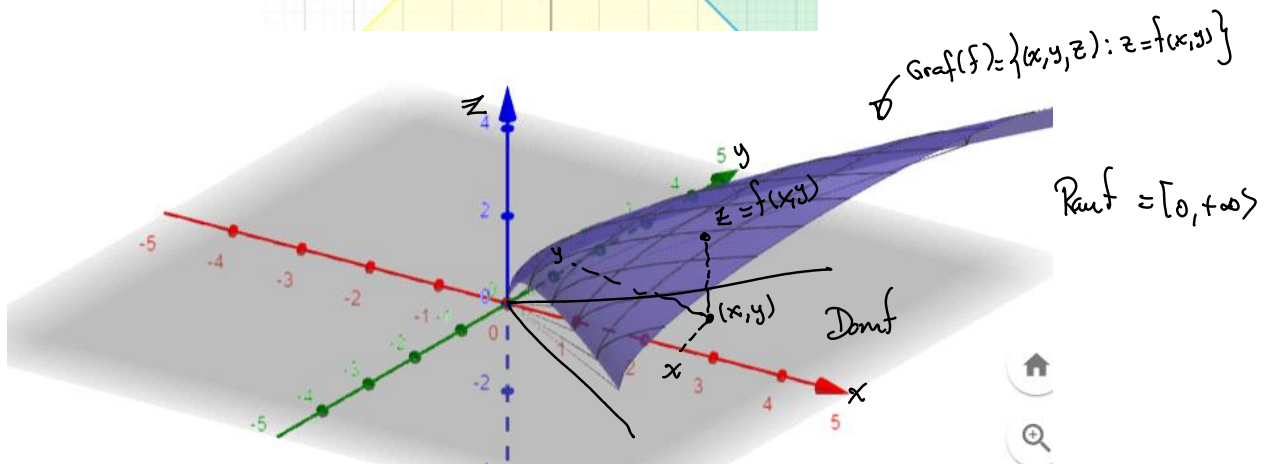
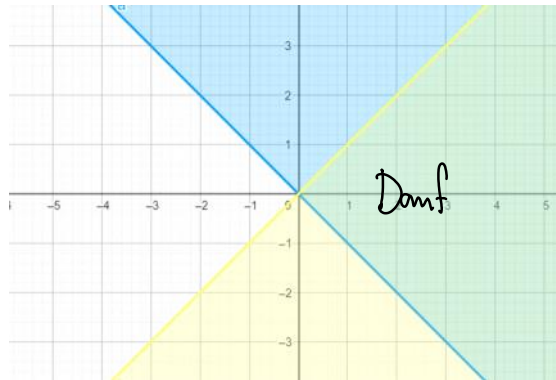
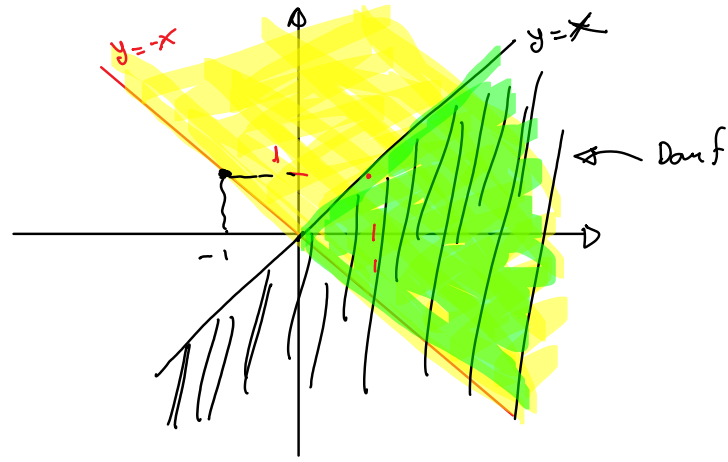


Gráfico de una función de varias variables

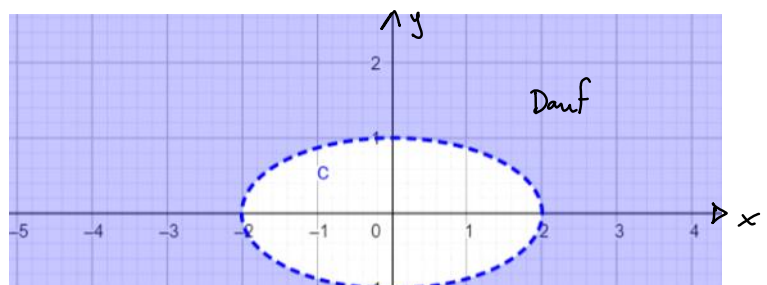
La gráfica de $f : U \subset \mathbb{R}^n \rightarrow \mathbb{R}$ se define y denota por

$\text{Graf}(f) = \{(x_1, \dots, x_n, y) \in \mathbb{R}^{n+1} : y = f(x_1, \dots, x_n)\}$

Ejemplo:

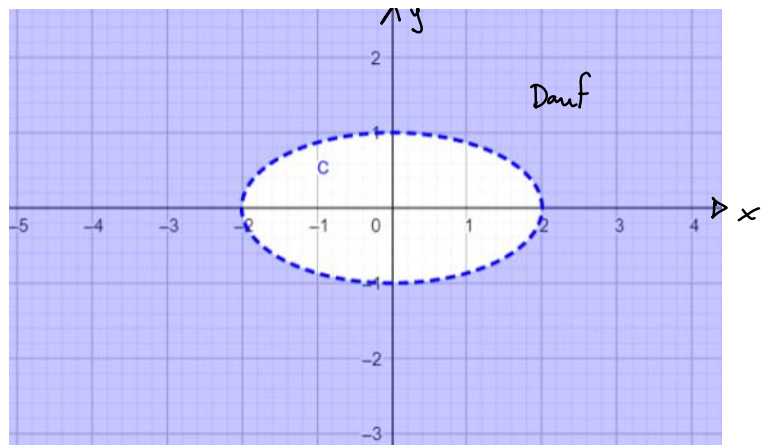
f) $f(x, y) = \ln(x^2 + 4y^2 - 4)$

Domf: $x^2 + 4y^2 - 4 > 0$
 $x^2 + 4y^2 > 4$
 $\frac{x^2}{4} + y^2 > 1$

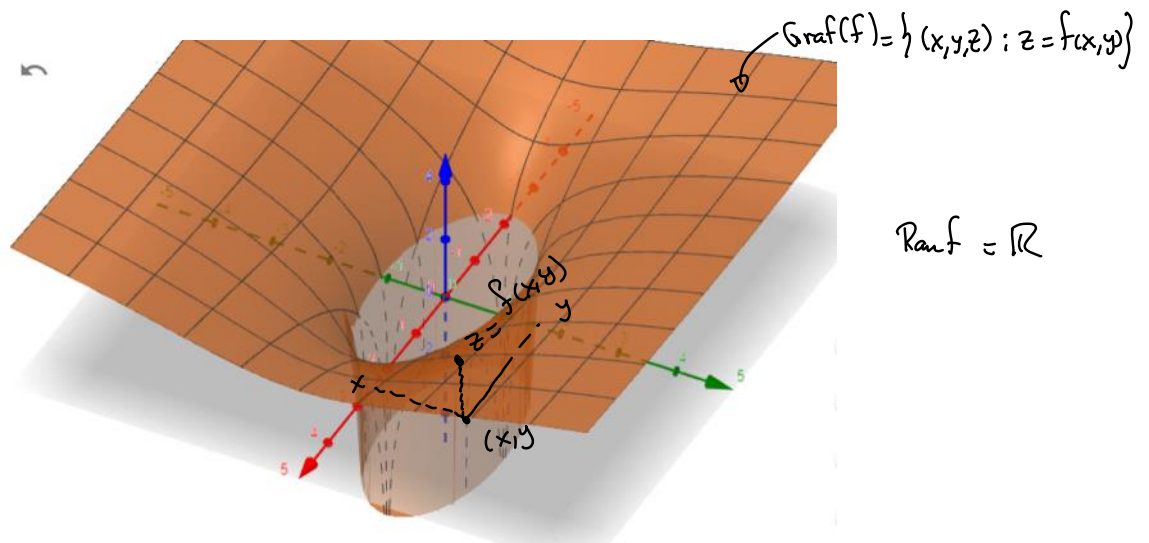


3) $f(x,y) = \ln(x^2 + 4y - 4)$

Domf: $x^2 + 4y^2 - 4 > 0$
 $x^2 + 4y^2 > 4$
 $\frac{x^2}{4} + y^2 > 1$



$\text{Domf} = \{ (x,y) \in \mathbb{R}^2 : \frac{x^2}{4} + y^2 > 1 \}$



Ejercicio:

7g) $z = \sqrt{1 - x^2 - y^2}$

7h) $z = \sqrt{x^2 + y^2}$