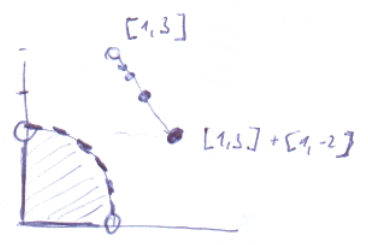


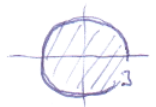
① $M = \{(x,y) \in \mathbb{R}^2 \mid x \geq 0 \wedge y \geq 0 \wedge x^2 + y^2 < 1\} \cup \{(1 + \frac{1}{2}, 3 - \frac{2}{2}) \in \mathbb{R}^2 : k \in \mathbb{N}\}$



$\text{int } M = \{x \in M \mid \exists U(x) : U(x) \subset M\} =$
 $\text{ext } M = X \setminus \bar{M} =$
 $\bar{M} = \{x \in X \mid \forall U(x) : \exists y \in U(x) : y \in M\} =$
 $\partial M = \bar{M} \cap \overline{(X \setminus M)} =$

3a $f(x,y) := \sqrt{9 - x^2 - y^2} - \sqrt{x^2 - y^2 - 1}$

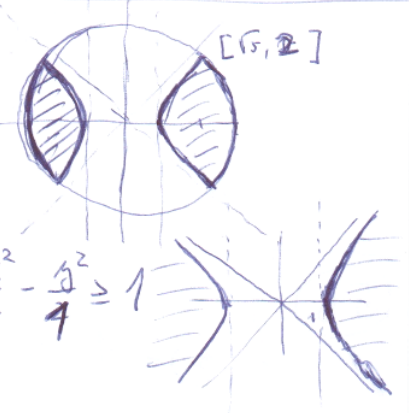
$D_f = \{(x,y) \in \mathbb{R}^2 \mid 9 - x^2 - y^2 \geq 0 \wedge x^2 - y^2 - 1 \geq 0\} =$



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

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

$\frac{x^2}{4} - \frac{y^2}{4} \geq 1$

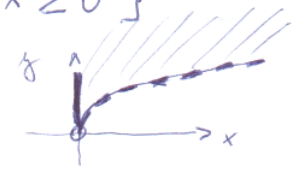


$1 = x^2 - (9 - x^2) \Rightarrow 10 = 2x^2 \Rightarrow |x| = \sqrt{5}$
 $|y| = 2$
 $"9 - (\sqrt{5})^2"$

3d $f(x,y) = \frac{1}{\sqrt{y - \sqrt{x}}}$

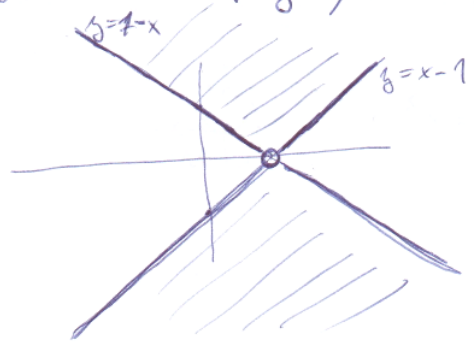
$D_f = \{(x,y) \in \mathbb{R}^2 \mid y - \sqrt{x} > 0 \wedge x \geq 0\}$

$y > \sqrt{x}$



3g $f(x,y) := \arcsin\left(\frac{x-1}{y}\right)$

$D_f = \{(x,y) \in \mathbb{R}^2 \mid -1 \leq \frac{x-1}{y} \leq 1 \wedge y \neq 0\}$



$y > 0$:

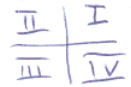
$-y \leq x-1 \leq y \Leftrightarrow \begin{cases} y \geq x-1 \\ y \geq 1-x \end{cases}$

$y < 0$:

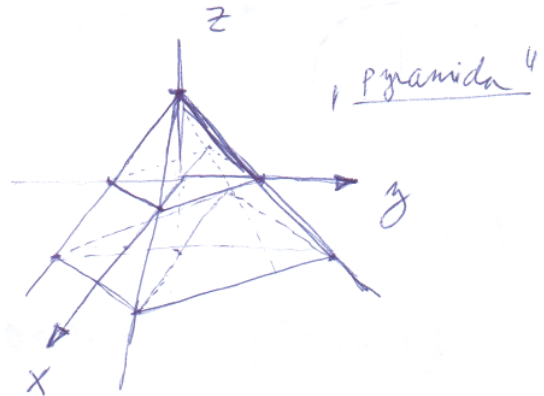
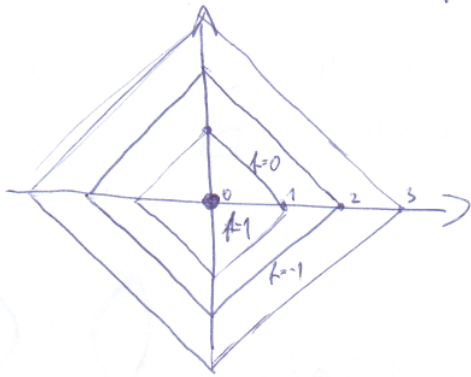
$-y \geq \frac{x-1}{y} \geq y \Leftrightarrow \begin{cases} y \leq x-1 \\ y \leq 1-x \end{cases}$

4a

$$f(x,y) = 1 - |x| - |y| = \begin{cases} 1-x-y & \text{--- } (x,y) \in \text{I} \\ 1+x-y & \text{--- } (x,y) \in \text{II} \\ 1+x+y & \text{--- } (x,y) \in \text{III} \\ 1-x+y & \text{--- } (x,y) \in \text{IV} \end{cases}$$



$D_f = \mathbb{R}^2$



5b

$$f(x,y) = 1 - \frac{x^2}{4} - \frac{y^2}{9} \dots \text{vrstevnica } c = f(x,y) = 1 - \frac{x^2}{4} - \frac{y^2}{9}$$

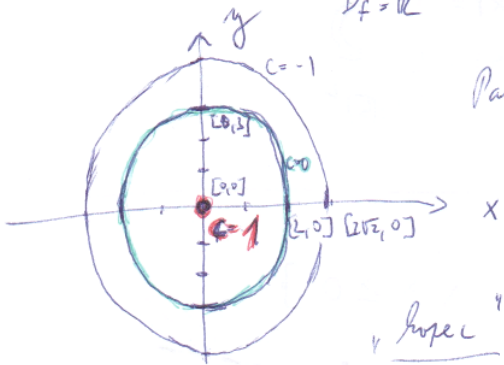
$D_f = \mathbb{R}^2$

rovnice: $c \in (-\infty, 1) \dots$ jelikoz $(\frac{x^2}{4} + \frac{y^2}{9}) \in (0, \infty)$

Pat:

$$\frac{x^2}{4} + \frac{y^2}{9} = 1 - c \geq 0 \xrightarrow{c=1} (x,y) = (0,0) \dots \text{bod}$$

$$\frac{x^2}{(2\sqrt{1-c})^2} + \frac{y^2}{(3\sqrt{1-c})^2} = 1 \dots \text{elipsa}$$



5d

$$f(x,y) = \min\{x^2, y\} = \begin{cases} x^2 & \text{--- } (x,y) \in M \\ y & \text{--- } (x,y) \in N \end{cases} = \begin{cases} \{ (x,y) \in \mathbb{R}^2 \mid y > x^2 \} \\ \{ (x,y) \in \mathbb{R}^2 \mid y \leq x^2 \} \end{cases}$$

