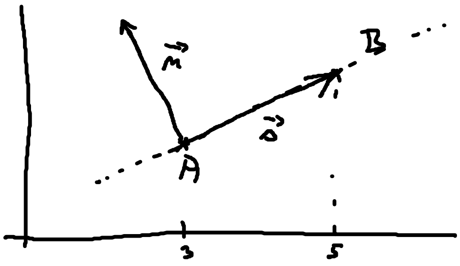



$A=[3,1]$ , $B=[5,4]$

$ax+by+c=0$

$\vec{s}=\vec{AB}=B-A=(2,3)$ $\quad\vec{n}=(3,-2)$

$x=3+2t$

$y=1+3t$ $\quad t\in\langle 0,1\rangle$

$3x-2y+c=0$

$3\cdot3-2\cdot1+c=0$

$7+c=0$ $\quad c=-7$

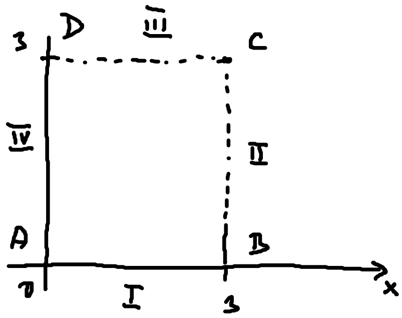
$\boxed{3x-2y-7=0}$

$2y=3x-7$

$\boxed{y=\frac{3}{2}x-\frac{7}{2} \quad , \; x\in\langle 3,5\rangle}$

---

$A=[0,0]$ , $B=[3,0]$ , $C=[3,3]$ , $D=[0,3]$



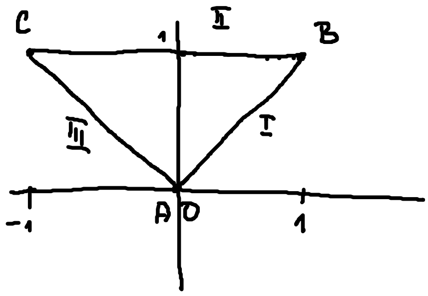

I : $y=0$ , $x\in\langle 0,3\rangle$

II : $x=3$ , $y\in\langle 0,3\rangle$

III : $y=3$ , $x\in\langle 0,3\rangle$

IV : $x=0$ , $y\in\langle 0,3\rangle$

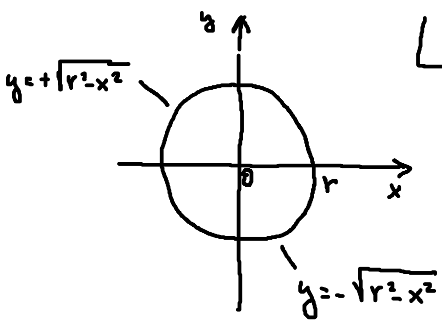
$A=[0,0]$ , $B=[1,1]$ , $C=[-1,1]$




II : $y=1$ , $x\in\langle -1,1\rangle$

I : $y=x$ , $x\in\langle 0,1\rangle$

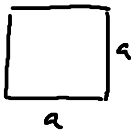
III : $y=-x$ , $x\in\langle -1,0\rangle$




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

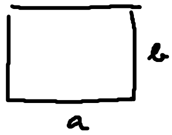
$y^2=r^2-x^2$

$y=\pm\sqrt{r^2-x^2}$




$S = a^2$ $\quad a > 0$

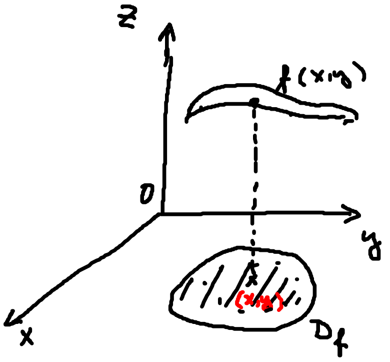
$o = 4a$



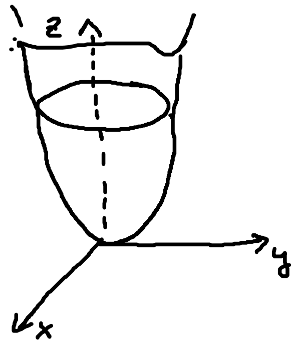

$S = a \cdot b$

$y = x^2$

$z = x \cdot y$ $\qquad z = \ln(y^2 - x)$




$z = x^2 + y^2$ $\qquad D_f = \{(x,y) \in \mathbb{R}^2\}$




$z = f(x,y)$ $\qquad z = x^2 + y^2$

$f: z = x^2 + y^2$

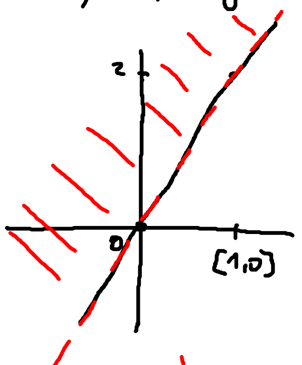
Určete def. obory a znázorněte je:

a) $z = \ln(y - 2x)$ , $y - 2x > 0$ $\qquad D_f = \{(x,y) \in \mathbb{R}^2;\ y - 2x > 0\}$

$\boxed{y - 2x > 0}$

$y - 2x = 0 \longrightarrow y = 2x$

$[1,0]$, $x = 1$, $y = 0$ ?



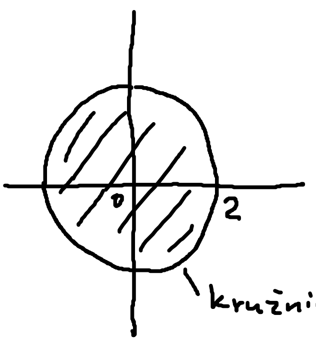

nepatří

b) $z = \sqrt{4 - x^2 - y^2}$ $\qquad \underline{4 - x^2 - y^2 \geq 0}$ $\qquad D_f = \{(x,y) \in \mathbb{R}^2;\ 4 - x^2 - y^2 \geq 0\}$

$4 - x^2 - y^2 = 0$

$4 = x^2 + y^2$ $\qquad \boxed{x^2 + y^2 = 4}$ $\quad r = 2$

$[0,0]$ $\qquad 4 - 0^2 - 0^2 \geq 0$



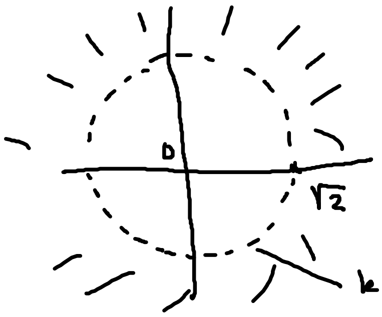

kružnice patří

c) $z = \dfrac{2x-y}{\sqrt{x^2+y^2-2}}$ $\quad x^2+y^2-2 \geq 0 \ \wedge \ \sqrt{x^2+y^2-2} \neq 0$

$D_f = \{(x,y) \in R^2;\ \underline{x^2+y^2-2 > 0}\}$

$x^2+y^2-2 = 0$

$x^2+y^2 = 2$




kružnice nepatří

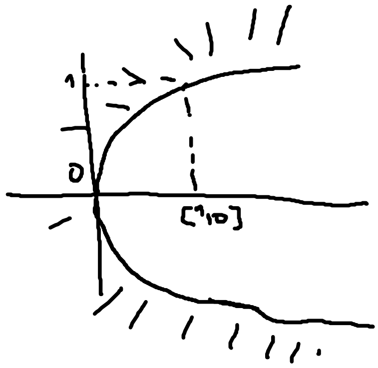
$[0,0]$

$0^2+0^2-2 \not> 0$

d) $z = \sqrt{y^2-x}$ $\quad \underline{y^2-x \geq 0}$, $\quad D_f \ldots$

$y^2-x=0$ $\quad \boxed{x = y^2}$ !

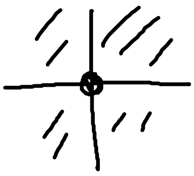
$y = \pm\sqrt{x}$

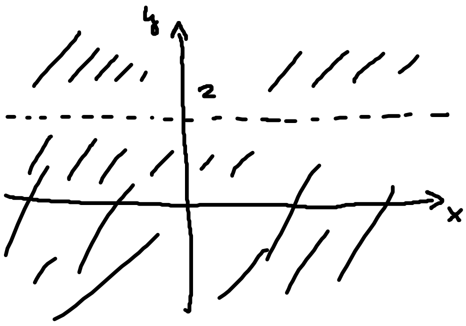



parabola patří

e) $z = \dfrac{x+y}{x^2+y^2}$ $\quad x^2+y^2 \neq 0$ $\quad D_f = \{(x,y) \in R^2,\ x^2+y^2 \neq 0\}$

$x^2+y^2 = 0$ $\quad \underline{(x,y) \neq (0,0)}$






přímka nepatří

f) $z = \dfrac{1}{y-2}$ $\quad \boxed{y-2 \neq 0}$ $\quad y=2$

$y \neq 2$

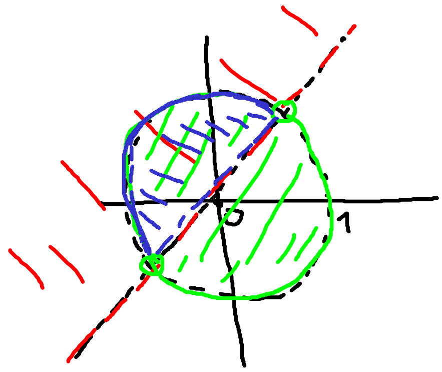
g) $z = \ln(y-x) + \sqrt{1-x^2-y^2}$ $\quad D_f = \{(x,y) \in R^2;\ y-x>0 \wedge 1-x^2-y^2 \geq 0\}$

$\boxed{y-x>0}$ $\quad \boxed{1-x^2-y^2 \geq 0}$

$y-x=0$ $\quad x^2+y^2=1$

$y=x$ $\quad [0,0]$ ✓

$[1,0]$ ✗



$z = f(x,y)$

$f_x,\ f'_x,\ z_x,\ z'_x \mid \frac{\partial z}{\partial x},\ \frac{\partial f}{\partial x}$

a) $z = x^2 \cdot y^4$ $\quad z_x = y^4 \cdot 2x = 2xy^4$ $\quad z_y = x^2 4y^3 = 4x^2y^3$

b) $z = x^2 + 2y^2 - 3xy^2 + 7x - y + 4$

$z_x = 2x + 0 - 3 \cdot 1 y^2 + 7 - 0 + 0 = 2x - 3y^2 + 7$

$z_y = 4y - 3x \cdot 2y - 1 = 4y - 6xy - 1$

c) $z = \frac{x+y}{x-y}$ $\quad z_x = \frac{1 \cdot (x-y) - (x+y) \cdot 1}{(x-y)^2} = \frac{-2y}{(x-y)^2}$

$z_y = \frac{1(x-y) - (x+y)(-1)}{(x-y)^2} = \frac{2x}{(x-y)^2}$

d) $z = \frac{x}{y}$ $\quad z_x = \frac{1 \cdot y - x \cdot 0}{y^2} = \frac{1}{y}$

$z = x \cdot \frac{1}{y}$ $\quad z_y = x(-y^{-2}) = -\frac{x}{y^2}$

podobně

$z = \frac{x}{y+3} = x \cdot \frac{1}{y+3}$

e) $z = (2x + 3y^2)^5$

$z_x = 5(2x+3y^2)^4 \cdot 2$ $\quad z_y = 5(2x+3y^2)^4 \cdot 6y$

f) $z = \sqrt{y-x}$ $\quad z_x = \frac{1}{2\sqrt{y-x}} \cdot (-1)$ $\quad z_y = \frac{1}{2\sqrt{y-x}} \cdot 1$

g) $z = \sqrt{x^2y + yx}$ $\quad z_x = \frac{1}{2\sqrt{x^2y+yx}} \cdot (2xy + y)$ $\quad z_y = \frac{1}{2\sqrt{x^2y+yx}} \cdot (x^2 + x)$

h) $z = \ln(x^2 - y)$ $\quad z_x = \frac{1}{(x^2-y)} \cdot 2x$ $\quad z_y = \frac{1}{(x^2-y)} \cdot (-1)$

i) $z = e^{x \cdot y^2}$ $\quad z_x = e^{xy^2} \cdot y^2$ $\quad z_y = e^{xy^2} \cdot 2xy$

j) $z = \cos(x-y)$ $\quad z_x = -\sin(x-y) \cdot 1$ $\quad z_y = -\sin(x-y) \cdot (-1)$

k) $z = x \cdot e^{y^2}$ $\quad z_x = 1 \cdot e^{y^2}$ $\quad z_y = x \cdot e^{y^2} \cdot 2y$

l) $\underline{z = \ln \left(\frac{y}{x+y}\right)}$ $\quad z_x = \frac{1}{\frac{y}{x+y}} \cdot \frac{0 - y \cdot 1}{(x+y)^2} = \frac{x+y}{y} \cdot \frac{-y}{(x+y)^2} = \frac{-1}{x+y}$

$$z_y = \frac{x+y}{y} \cdot \frac{1 \cdot (x+y) - y \cdot 1}{(x+y)^2} = \frac{x}{y(x+y)}$$