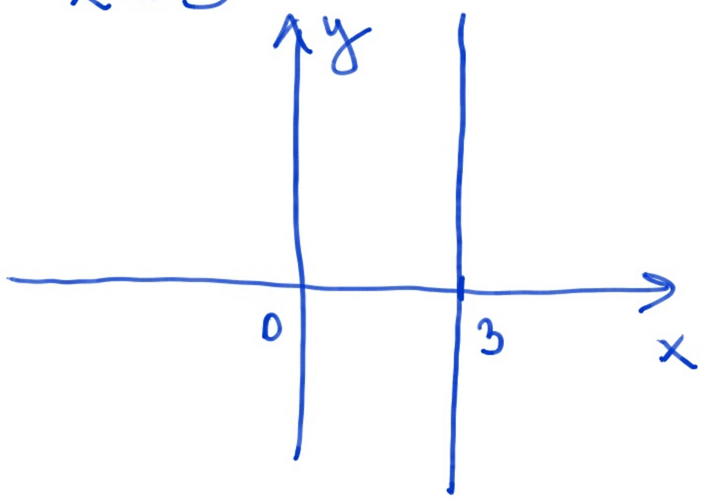
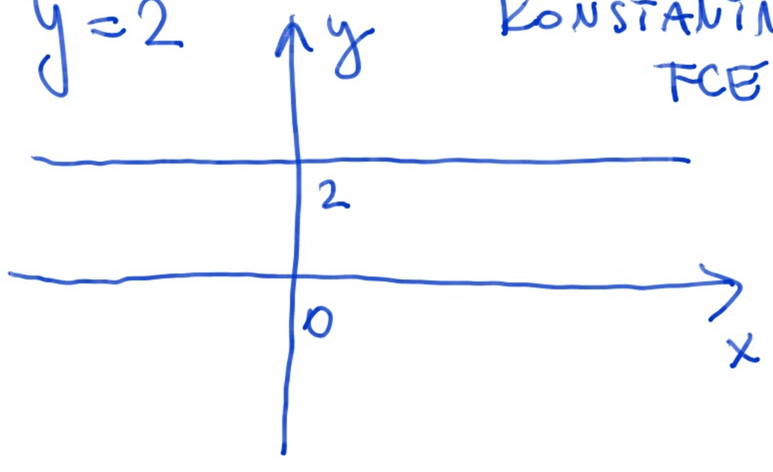
① Načrtněte přímky a) $x=3$, b) $y=2$, c) $y=2x-3$

a) $x=3$



b) $y=2$



KONSTANTNÍ FCE

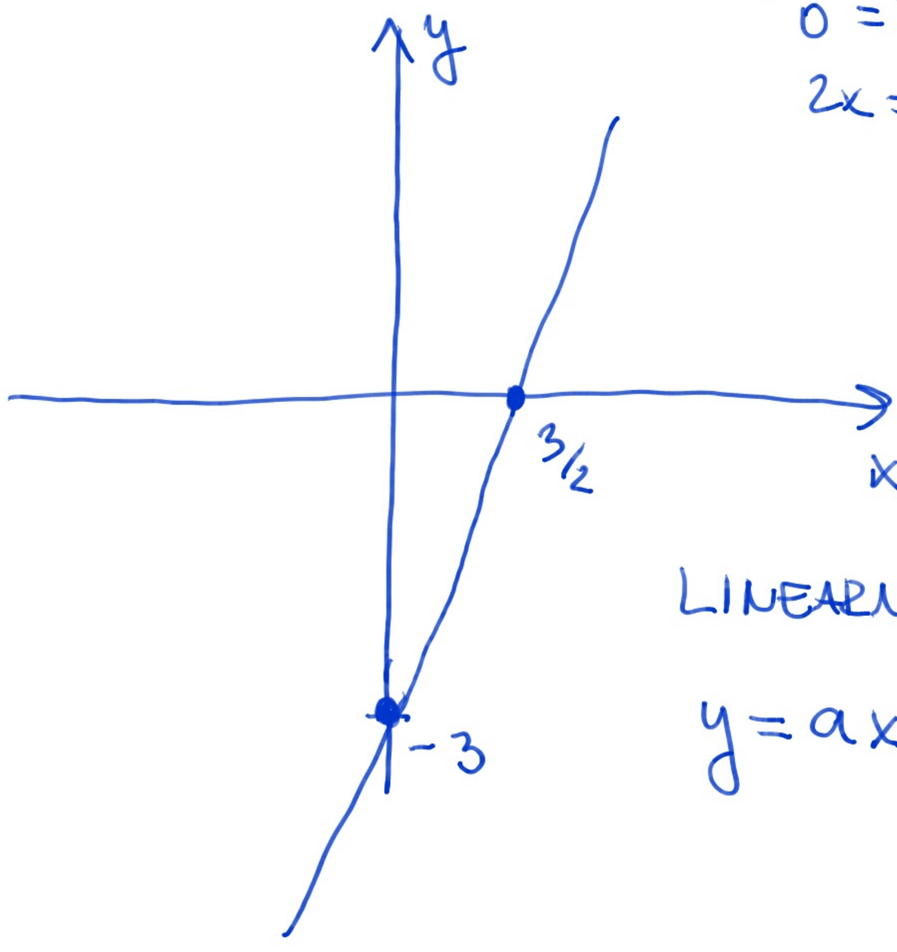
c) $y=2x-3$

$y=0$:

$0=2x-3$

$2x=3$

$x=\frac{3}{2}$



LINEÁRNÍ FCE

$y=ax+b$

② Vyřeš rovnice a) $3^x = 7$, b) $\ln x = 5$, c) $x^2 - x - 2 = 0$

a) $3^x = 7$

$x = \log_3 7$

b) $\ln x = 5$

$x = e^5$

c) $x^2 - x - 2 = 0$

$ax^2 + bx + c = 0$

$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x_{1,2} = \frac{1 \pm \sqrt{1 - 4 \cdot 1 \cdot (-2)}}{2}$

$= \frac{1 \pm 3}{2} = \begin{cases} 2 \\ -1 \end{cases}$

$(x-2)(x+1) = 0$

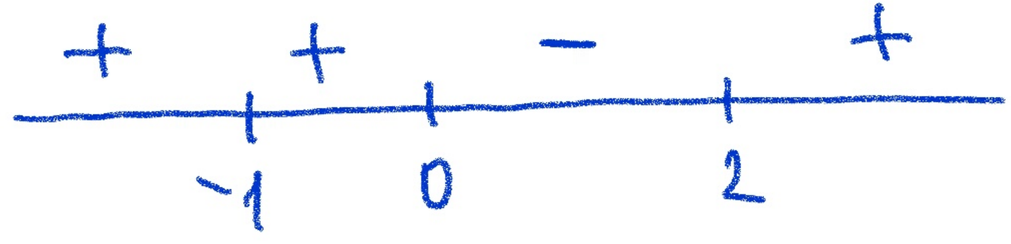
③ Vyřeště nerovnice:

a) $x^2 - x - 2 \geq 0$

$(x-2)(x+1) \geq 0$

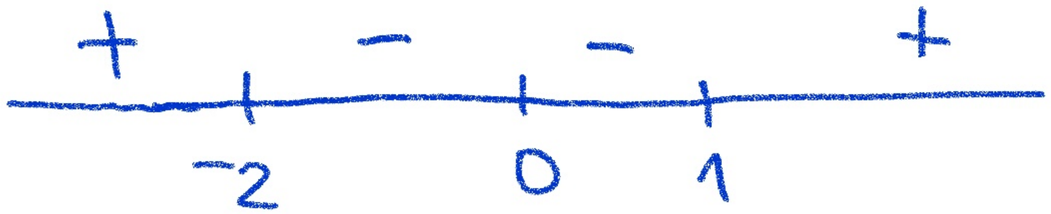
$x \in (-\infty, -1\rangle \cup \langle 2, \infty)$

b) $x(x+1)^2(x-2)^3 > 0$



$x \in (-\infty, -1) \cup (-1, 0) \cup (2, \infty)$

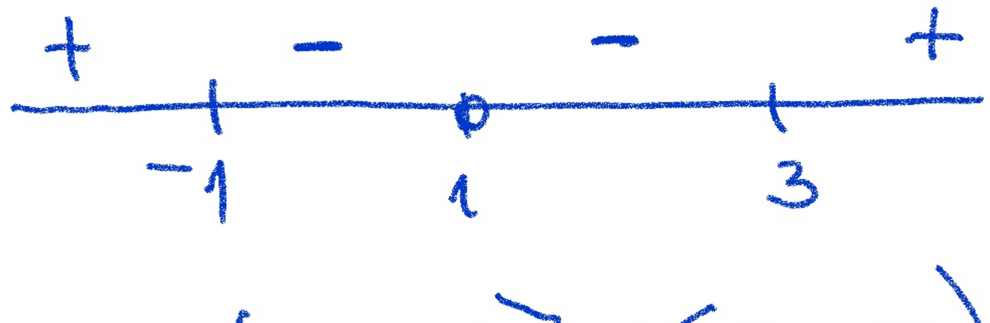
c) $x^2(x-1)(x+2) \leq 0$



$x \in \langle -2, 1 \rangle$

d) $\dfrac{(x+1)(x-3)^3}{(x-1)^2} \geq 0$

$x \neq 1$



$x \in (-\infty, -1\rangle \cup \langle 3, \infty)$

④ URČETE DEFINIČNÍ OBOR FUNKCE:

a) $f(x) = \sqrt{x-3}$

$x - 3 \geq 0$

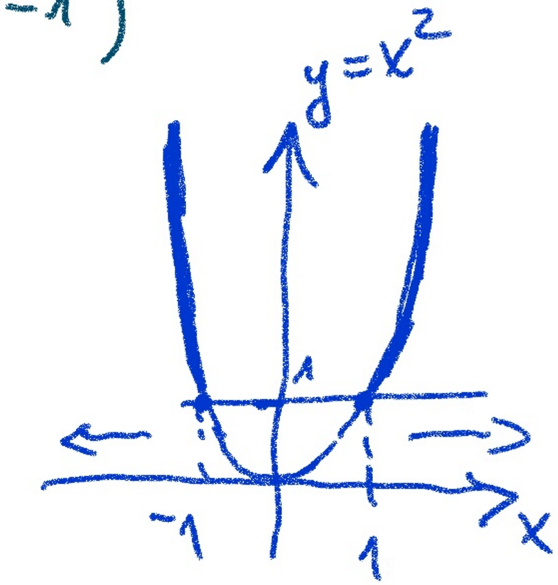
$x \geq 3$

$D(f) = \langle 3, \infty)$

b) $f(x) = \ln(x^2 - 1)$

$x^2 - 1 > 0$

$x^2 > 1$

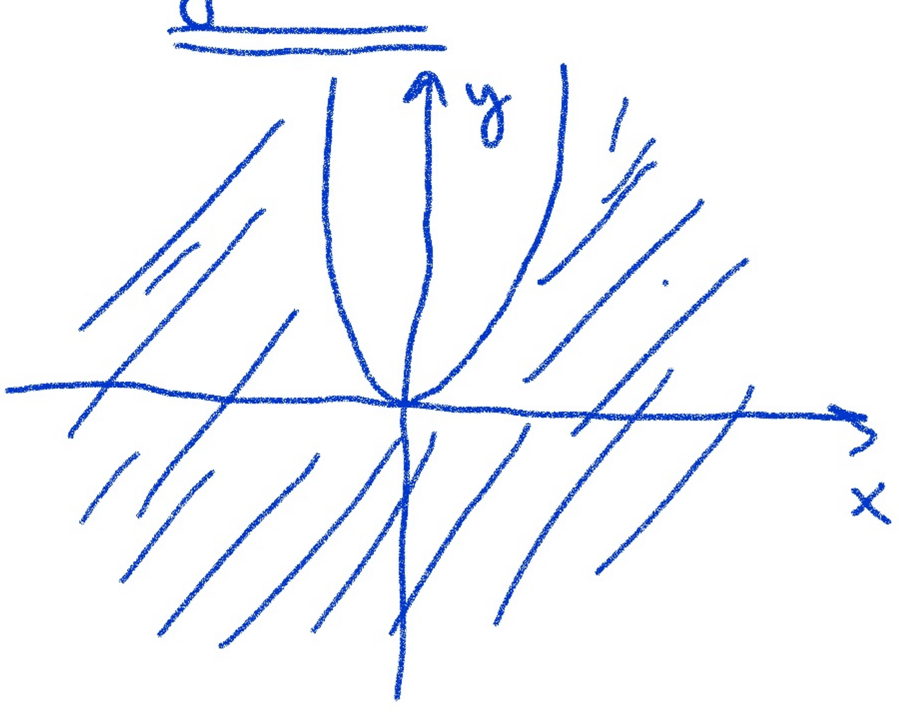


$D(f) = (-\infty, -1) \cup (1, \infty)$

c) $f(x,y)=\sqrt{x^2-y}$

$x^2-y \geq 0$

$\underline{\underline{y \leq x^2}}$

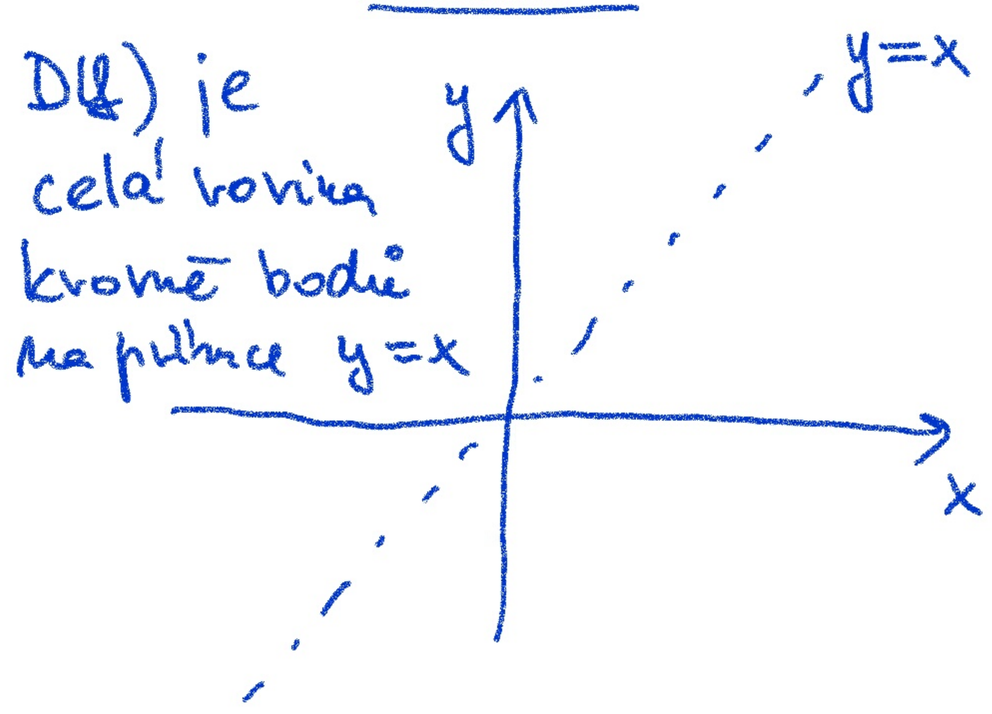


d) $f(x,y)=\frac{x^2+1}{x-y}$

$x-y \neq 0$

$\underline{\underline{y \neq x}}$

D(f) je celá rovina kromě bodů na přímce $y=x$



(5) Nakreslete vrstevnice

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

$\sqrt{x^2 - y} = c \quad , c \geq 0$

$x^2 - y = c^2$

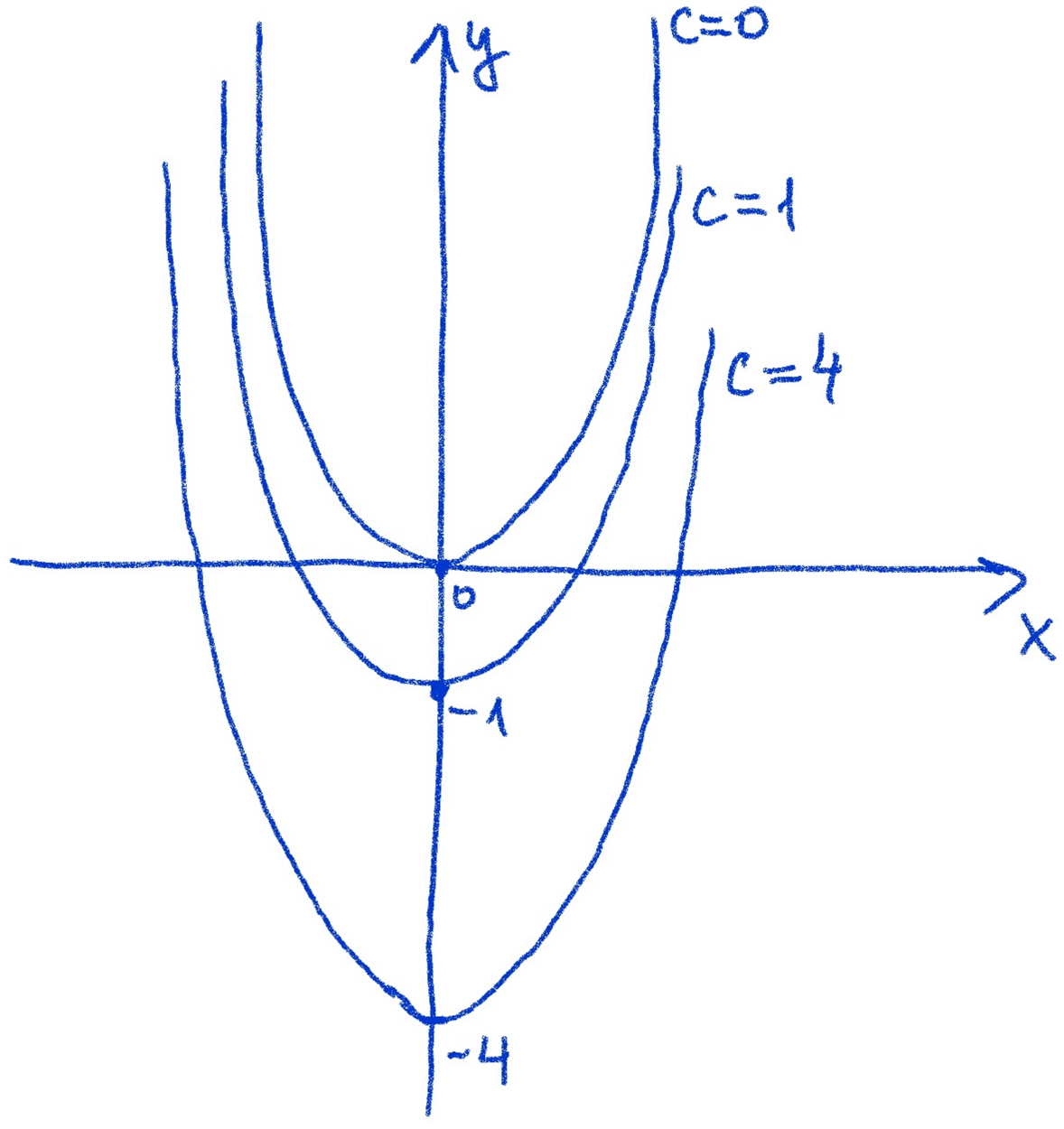
$y = x^2 - c^2$

$c = 0$: $y = x^2$

$c = 1$: $y = x^2 - 1$

$c = 2$: $y = x^2 - 4$

$\vdots$



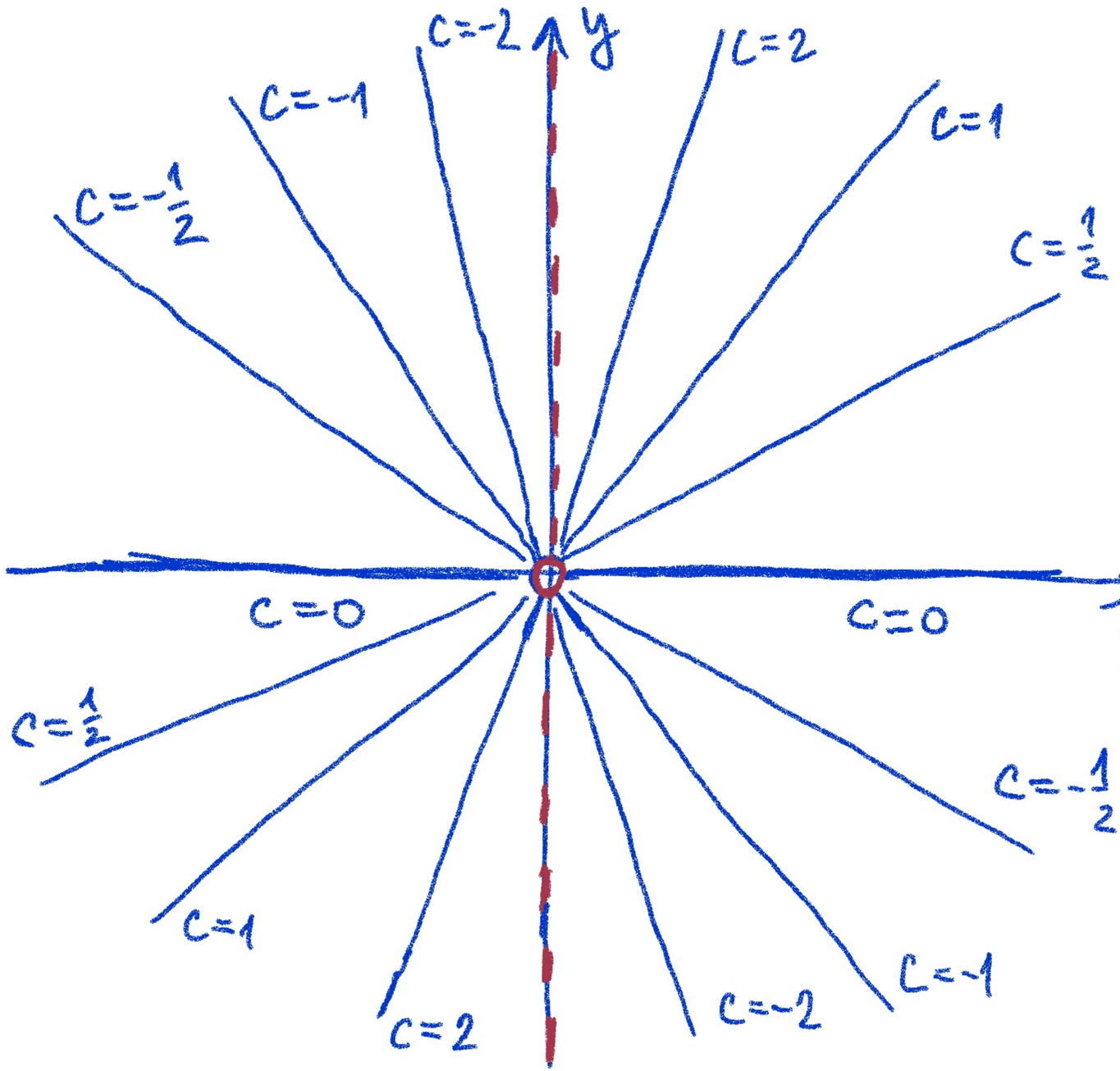
b) $z = \frac{y}{x}$

$x \neq 0$

$\frac{y}{x} = c$

$\underline{y = cx}$

$c = 0 : y = 0$
$c = 1 : y = x$
$c = -1 : y = -x$
$c = 2 : y = 2x$
$c = -2 : y = -2x$
$c = 1/2 : y = \frac{1}{2}x$



c) $f(x,y) = \min(x,y)$

$\min(x,y) = c$

$x \geq y : \; y = c$

$x \leq y : \; x = c$