$\vec{x}_1, \vec{x}_2, \dots, \vec{x}_m$

$c_1\vec{x}_1 + c_2\vec{x}_2 + \dots + c_m\vec{x}_m$

$2(3,4) + 3(1,2) = (6,8) + (3,6) = (9,14)$

LN $\quad c_1\vec{x}_1 + c_2\vec{x}_2 + \dots + c_m\vec{x}_m = \vec{0} \Rightarrow c_1 = c_2 = \dots = c_m = 0$

LZ $\quad \neg LN \quad \exists c_1, c_2, \dots, c_m \in \mathbb{R}, \exists i \in \{1,2,\dots,m\} : c_i \neq 0 \wedge$

$\wedge\ c_1\vec{x}_1 + c_2\vec{x}_2 + \dots + c_m\vec{x}_m = 0$

$(2,1,3) \qquad (2,1,-3)$ $\qquad$? LN, LZ

LN

$c_1(2,1,3) + c_2(2,1,-3) = (0,0,0)$

Ľ $= (2c_1, c_1, 3c_1) + (2c_2, c_2, -3c_2) = (2c_1+2c_2, c_1+c_2, 3c_1-3c_2)$

$(2c_1+2c_2, c_1+c_2, 3c_1-3c_2) = (0,0,0)$

$3c_1 - 3c_2 = 0$

$3c_1 = 3c_2$

$c_1 = c_2$

$c_2 = c_1 = 0$

$c_1 + c_2 = 0$

$c_1 + c_1 = 0$

$2c_1 = 0$

$c_1 = 0$

$c_1(2,1,3) + c_2(2,1,-3) = (0,0,0) \Rightarrow c_1 = c_2 = 0$

$(1,2,3) \quad (1,2,4) \quad (2,4,7)$

$(1,2,3) \quad 1 \qquad \frac{1}{1} = 1, \ \frac{2}{2} = 1, \ \frac{4}{3} = 1,\overline{33}$

$$(1,2,3)+(1,2,4)=(2,4,7)$$

$$1\cdot(1,2,3)+1\cdot(1,2,4)=1\cdot(2,4,7) \qquad +(-1)(2,4,7)$$

$$1\cdot(1,2,3)+1\cdot(1,2,4)+(-1)(2,4,7)=(0,0,0) \quad LZ$$

$(1,0)\quad(0,1)\qquad(-5,3)\qquad \underline{c_1=-5\quad c_2=3}$

$$c_1(1,0)+c_2(0,1)=(c_1,0)+(0,c_2)=(c_1,c_2)$$

$$(c_1,c_2)=(-5,3)$$

$(1,2)\quad(2,1)\qquad(-4,1)\qquad c_1=2\quad c_2=-3$

$$c_1(1,2)+c_2(2,1)=(-4,1)$$

$$c_1(1,2)+c_2(2,1)=(c_1,2c_1)+(2c_2,c_2)=(c_1+2c_2,2c_1+c_2)$$

$$(c_1+2c_2,2c_1+c_2)=(-4,1)$$

$$\left.\begin{aligned}c_1+2c_2&=-4\\2c_1+c_2&=1\end{aligned}\right\}\Rightarrow c_1=2,\ c_2=-3$$

$f(x)=x^3-3x+1 \qquad D_f=D(f)$

$D_f=R$

$f(x)=\dfrac{3x}{x^2-4} \qquad D_f \qquad R\setminus\{2\}$

$D_f=R\setminus\{-2,2\}$

$x^2-4\neq 0$

$D_f=(-\infty,-2)\cup(-2,2)\cup(2,\infty)$

$x^2-4=0 \qquad x^2=4$

$x\in\{-2,2\}$

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

$f(x)=\frac{1}{x\sqrt{2x+1}}$ $\qquad$ $\underline{\underline{D_f=(-\frac{1}{2},\infty)\setminus\{0\}}}$

$x\neq 0,\ x\neq -\frac{1}{2}$ $\qquad$ $\mathbb{R}\setminus\{0,-\frac{1}{2}\}$

$\sqrt{2x+1}$ $\qquad$ $2x+1\geq 0$

$2x\geq -1$

$x\geq -\frac{1}{2}$

$\langle -\frac{1}{2},\infty)\setminus\{0,-\frac{1}{2}\}=$

$=(-\frac{1}{2},\infty)\setminus\{0\}=$

$=(-\frac{1}{2},0)\cup(0,\infty)$

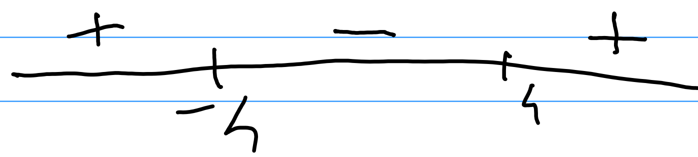
$f(x)=\frac{3x+2}{\sqrt{(x-4)(x+4)}}$ $\qquad$ D_f

$(4,\infty)$

$(-\infty,-4)\cup(-4,4)\cup(4,\infty)$

$(-\infty,-4)\cup(4,\infty)$

$(x-4)(x+4)\geq 0$



$(x-4)(x+4)\neq 0$

$D_f=(-\infty,-4)\cup(4,\infty)$

$x^2-16\geq 0$

$x^2\geq 16$

$|x|\geq 4$

$f(x)=\sqrt{x-\sqrt{x+2}}$ $\qquad$ D_f

$(-2,\infty)$

$(-2,0)$

$\underline{\langle 2,\infty)}$

$\sqrt{x+2}$ $\qquad$ $x+2\geq 0$

$x\geq -2,\ x\geq 0$

$\sqrt{x-\sqrt{x+2}}$ $\qquad$ $x-\sqrt{x+2}\geq 0$

$x\geq\sqrt{x+2}\geq 0$

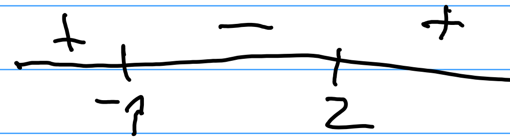
$$x - \sqrt{x+2} \geq 0$$

$$x \geq \sqrt{x+2}$$

$$x^2 \geq x + 2$$

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

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



$x \leq -1 \vee x \geq 2$ $\longleftrightarrow$ $\underbrace{x \geq -2,\ x \geq 0}_{x \geq 0}$ $\qquad$ $\underline{\underline{x \geq 2}}$

$$D_f = \langle 2, \infty)$$

$$f(x) = \sqrt{4 - x^2}$$

D_f, H_f

$$4 - x^2 \geq 0$$

$$4 \geq x^2$$

$$x^2 \leq 4$$

$$|x| \leq 2 \qquad x \in \langle -2, 2\rangle$$

$D_f = \langle -2, 2\rangle$

H_f

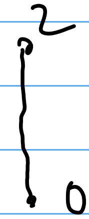
$x = 2$

$$\sqrt{4 - 2^2} = 0$$

$x = 0$

$$\sqrt{4 - 0^2} = 2$$

$\langle 2, \infty)$

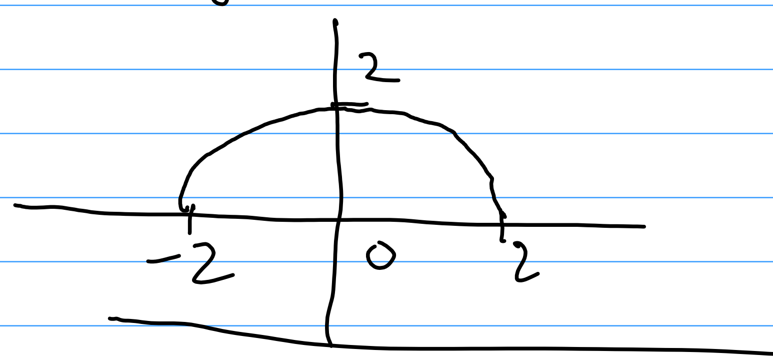


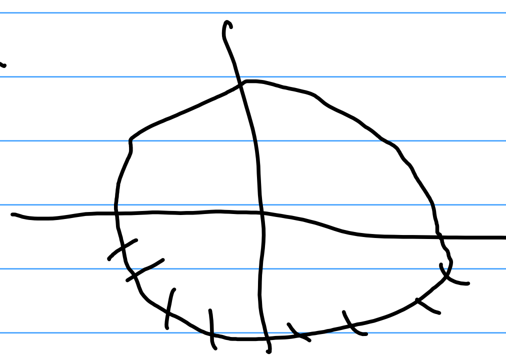
$H_f = \langle 0, 2\rangle$

$$y = \sqrt{4 - x^2}$$

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

$$\underline{x^2 + y^2 = 4}$$





$f: \langle 0, \infty) \to \langle -4, \infty) \qquad f(x) = -4 + 2\sqrt{x}$

bijekcia $\qquad f^{-1}$

injekcia $\qquad x_1 \neq x_2 \Rightarrow f(x_1) \neq f(x_2)$

surjekcia $\qquad f: A \to B \qquad \forall y \in B\ \exists x \in A: y = f(x)$

injekcia $\qquad \underline{f(x_1) = f(x_2) \Rightarrow x_1 = x_2}$

$\underline{f(x_1) = f(x_2)} \Rightarrow -4 + 2\sqrt{x_1} = -4 + 2\sqrt{x_2} \Rightarrow$

$\Rightarrow 2\sqrt{x_1} = 2\sqrt{x_2} \Rightarrow \sqrt{x_1} = \sqrt{x_2} \Rightarrow \underline{x_1 = x_2}$

$y = -4 + 2\sqrt{x} \qquad \langle -4, \infty)$

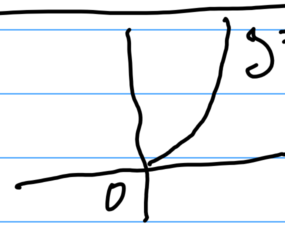
$\forall y \in \langle -4, \infty)\ \exists x \in \langle 0, \infty)$

$f(x) = y$

$y + 4 = 2\sqrt{x} \qquad \langle 0, \infty)$

$\frac{y+4}{2} = \sqrt{x} \qquad \langle 0, \infty)$

$\frac{1}{4}(y+4)^2 = x \qquad \langle 0, \infty)$



$x = \frac{1}{4}(y+4)^2$

$f^{-1}(x) = \frac{1}{4}(x+4)^2$