RzM_4

streda 21. októbra 2026 8:18

TRANSFORMÁCIA GRAFOV

$y = f(x)$

① $y = f(x-a)$ $\quad x \mapsto x-a$ → posun grafu $f(x)$ po osi x

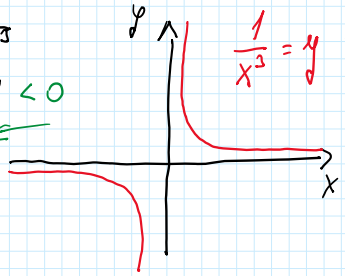
ak $a > 0$, tak do prava →

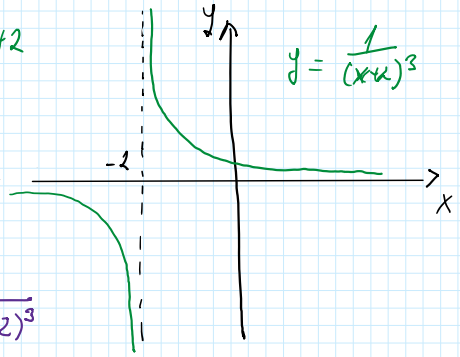
ak $a < 0$, tak do lava ←

Pr.: $y = (x+2)^{-3} = \frac{1}{(x+2)^3}$

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

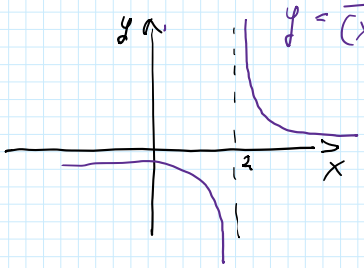
$a = -2 < 0$ ⇐





$\frac{1}{(x-2)^3}$

$(x \boxminus a) \Rightarrow a = 2 > 0$

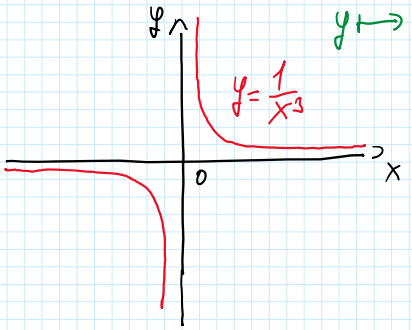


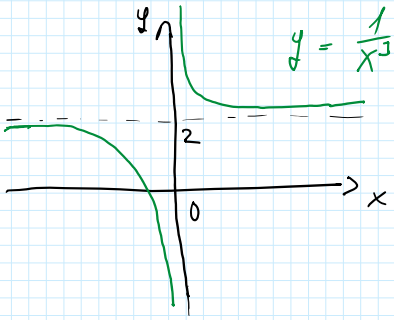
$f(x) + a$ $\quad y \mapsto y + a$ → posun grafu $f(x)$ po osi y

hore ak $a > 0$ ↑

dole ak $a < 0$ ↓

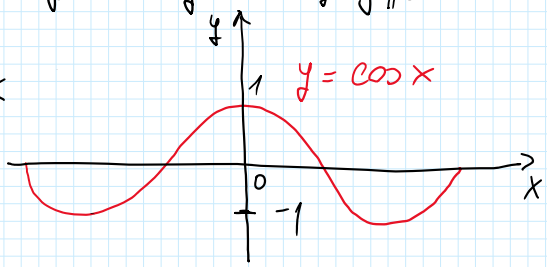
$y = \frac{1}{x^3} + 2$

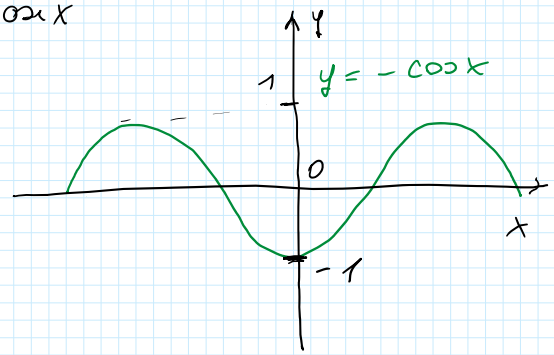




$-f(x)$ $\quad y \mapsto -y$ → graf „otočím" dolu osi x

$y = -\cos x$



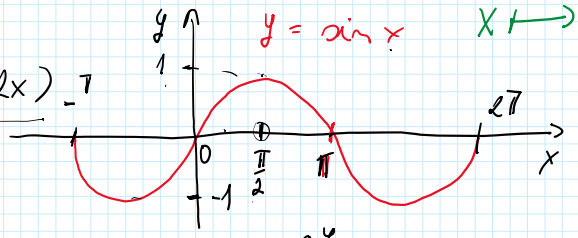


$y = f(kx)$ $\quad x \longmapsto kx$

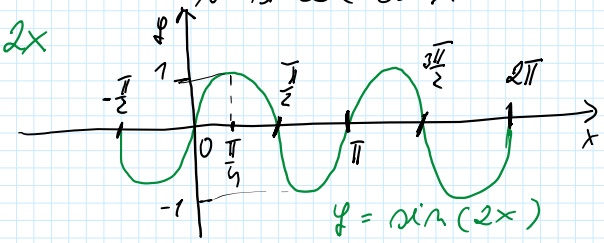
ak $k > 1$ → k-násobné stlačenie v smere osi x

ak $0 < k < 1$ → k-násobné roztiahnutie v smere osi x

$y = \sin(2x)$

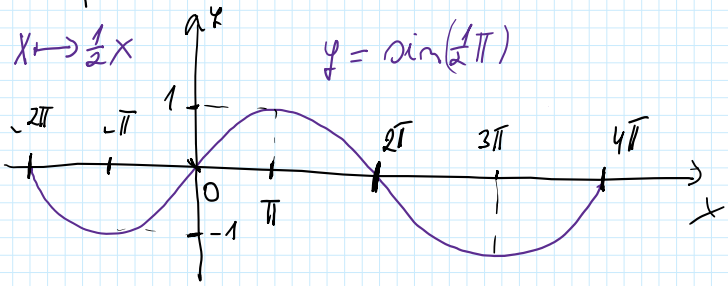


$x \longmapsto 2x$



$y = \sin\left(\frac{1}{2}x\right)$

$x \longmapsto \frac{1}{2}x$

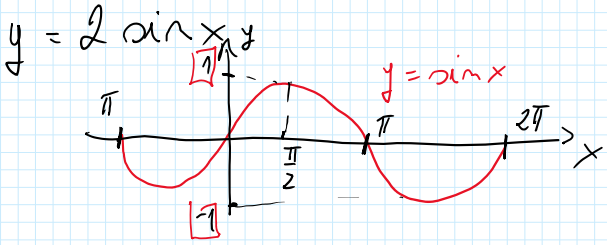


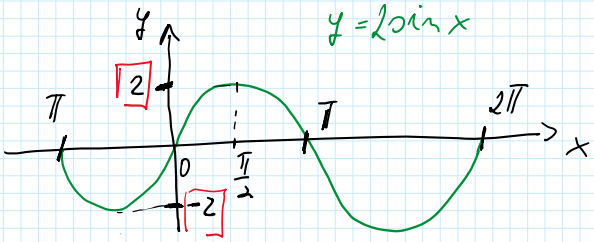
$y = k \cdot f(x)$ $\quad y \longmapsto ky$

ak $k > 1$ → k-násobné natiahnutie v smere osi y

ak $0 < k < 1$ → k-násobné stlačenie v smere osi y

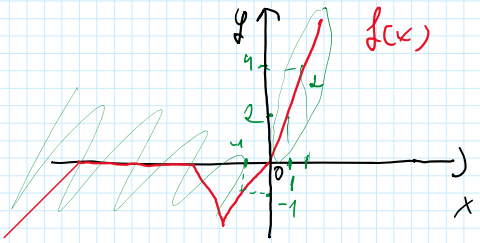
$y = 2\sin x$





$x \longmapsto |x|$

$f(x) \longmapsto f|x|$



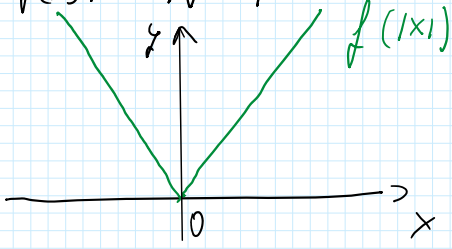
?

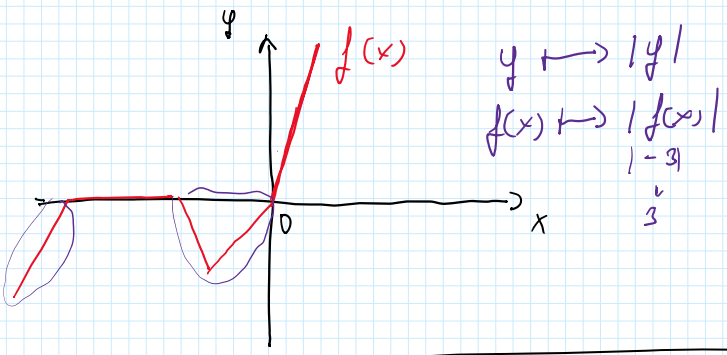
$x \longmapsto |x|$

$f(x) \longmapsto f(|x|)$

$y \longmapsto |y|$

$f(x) \longmapsto |f(x)|$

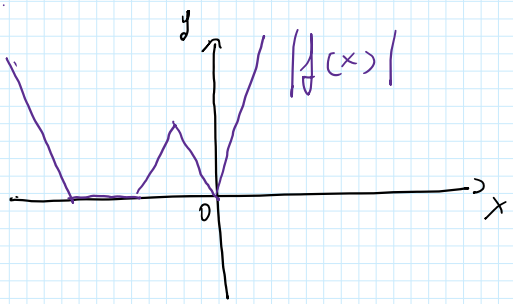




$y \mapsto |y|$

$f(x) \mapsto |f(x)|$

$|-3| = 3$



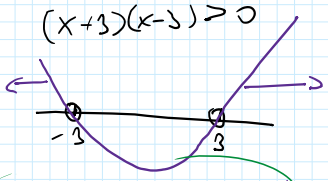
$$f(x) = \frac{x}{\sqrt{x^2-9}} - \arcsin\frac{2x+3}{11}$$

$\sqrt[n]{\heartsuit}$ ak n je párne $\heartsuit \geq 0$

$\sqrt[3]{-1} = -1$ ak n je nepárne ?

$x^2 - 9 > 0$

$(x+3)(x-3) > 0$



$(-\infty; -3) \cup (3; \infty)$

$-1 \leq \frac{2x+3}{11} \leq 1$

$-1 \leq \frac{2x+3}{11} \wedge \frac{2x+3}{11} \leq 1$

$-11 \leq 2x+3$

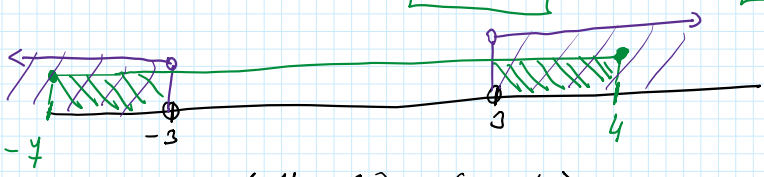
$-14 \leq 2x$

$-7 \leq x$

$2x+3 \leq 11$

$2x \leq 8$

$x \leq 4$



$D(f) = \langle -7; -3) \cup (3; 4 \rangle$

Pr: $f(x) = \sqrt[5]{\frac{2-x}{x+1}} + \sqrt[4]{\frac{4-x^2}{h(x+4)}}$

$x+1 \neq 0$

$x \neq -1$



$D(f) \in (0; \infty)$

$x > 0$

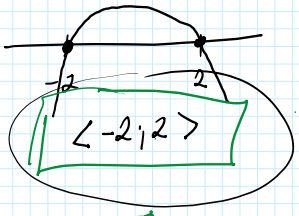
$4 - x^2 \geq 0 \wedge x+4 > 0 \wedge h(x+4) \neq 0$

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

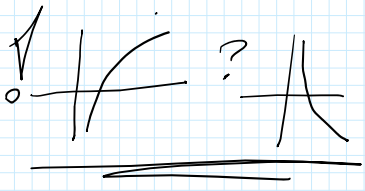
$x > -4$

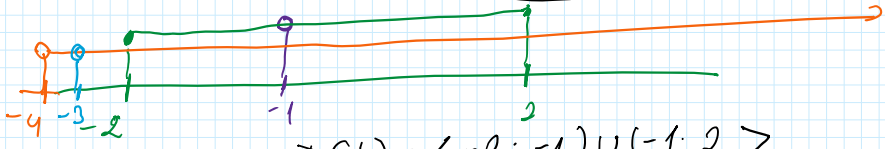
$x+4 \neq 1$

$x \neq -3$



$\langle -2; 2 \rangle$





$D(f) = \langle -2; -1) \cup (-1; 2 \rangle$

Př: $f(x) = \sqrt{\frac{x-3}{x-1}} - \frac{x+2}{\sqrt[3]{1-\ln x}}$

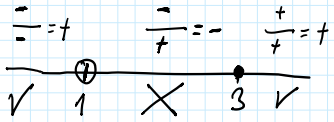
V_1 V_2

$\ln \heartsuit = 0 \Rightarrow \heartsuit = 1$

$\ln \heartsuit = 1 \Rightarrow \heartsuit = e$

V_1: $\frac{x-3}{x-1} \geq 0 \wedge x-1 \neq 0$

$x \neq 1$

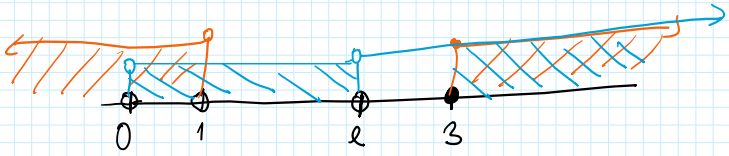


$(-\infty; 1) \cup \langle 3; \infty)$

V_2: $x > 0 \wedge 1 - \ln x \neq 0$

$\ln x \neq 1$

$x \neq e$

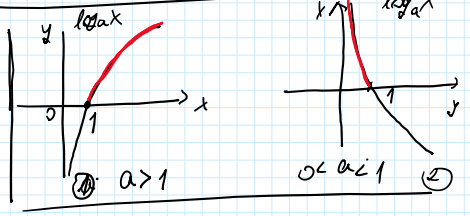


$D(f) = (0,1) \cup \langle 3; \infty)$

$D(f)$: $V_1 \cap V_2$

Př: $f(x) = \frac{\sqrt{2\log_{\frac{1}{2}}(3-\frac{x}{2})}}{1-x^2} + \frac{1-3\ln(x+4)}{\sqrt{-x^2+5x+14}}$

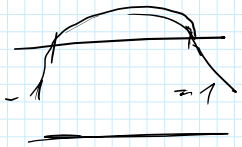
V_1 V_2



V_1: $2\log_{\frac{1}{2}}(3-\frac{x}{2}) \geq 0 \wedge 3-\frac{x}{2} > 0 \wedge 1-x^2 \neq 0$

$(1-x)(1+x) \neq 0$

$x \neq \pm 1$



$0 < 3-\frac{x}{2} \leq 1$

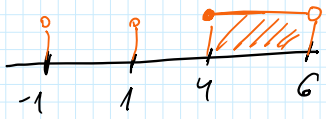
$3 > \frac{x}{2}$

$6 > x$

$3-\frac{x}{2} \leq 1$

$2 \leq \frac{x}{2}$

$4 \leq x$

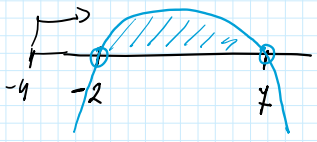


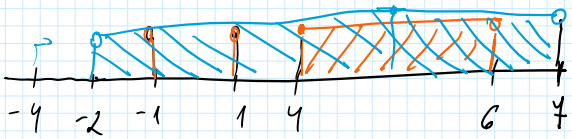
$\langle 4; 6)$

V_2: $x+4 > 0 \wedge -x^2+5x+14 > 0$

$x > -4 \wedge -(x+2)(x-7) > 0$

$(-2; 4)$





$D(f) = \langle 4, 6)$