4. webinář 2020-04-07

Témata

- Poznámky k $\log_a x$ a e^x
  - koronavirus ✓
  - logistická křivka ✗
  - log. pravítko ✓
  - kalkulačky ✓
- Goniom. fce ✓
  - významné body ✓
- Cyklometrické funkce ✓

Rovnice

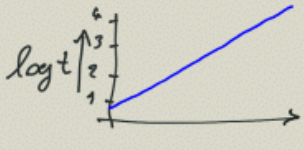
ae^{bt}

log:

$\log(ae^{bt}) = \log a + \log e^{bt} =$

$= \underbrace{\log a}_{q} + bt \log e = kt + q$

čísla, ozn k



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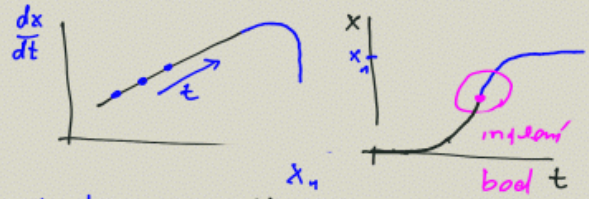
x ... poloha $x(t)$

$v = \frac{dx}{dt}$

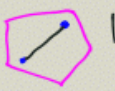
pokud platí $v = kx$ $\left(\frac{dx}{dt} = kx(t)\right)$

diferenciální rovnice ← má řešení $x(t) = x_0 e^{kt}$

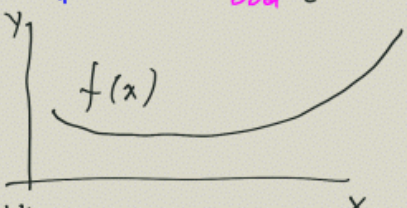


x_1

- konvexní funkce

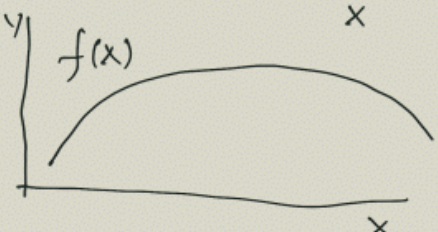


konvexní množina

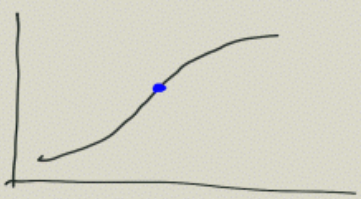


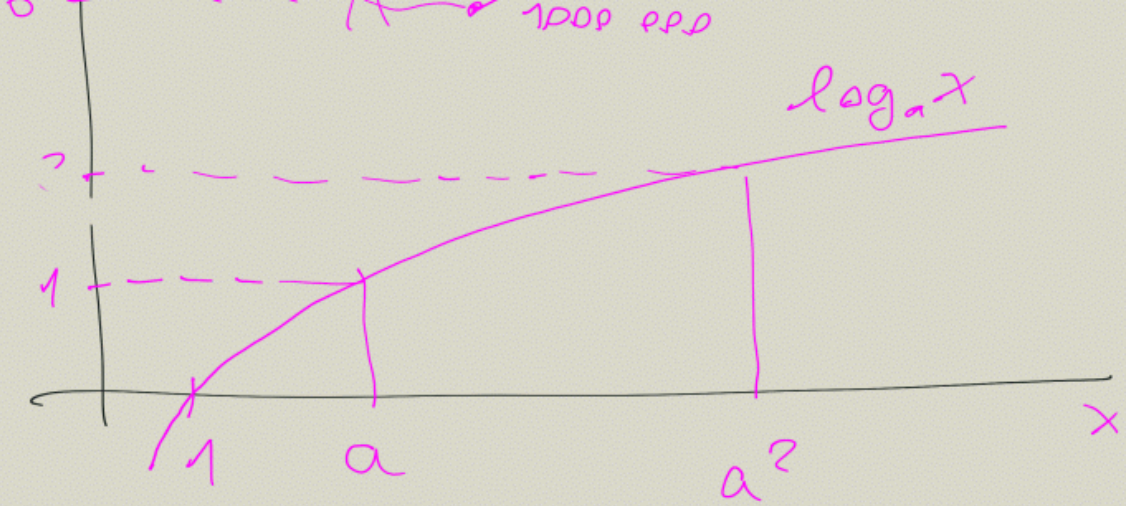
- konkávní funkce

nekonvexní množina



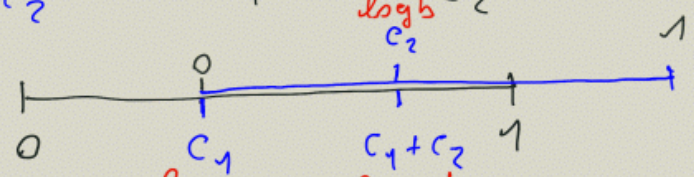
- inflexní bod



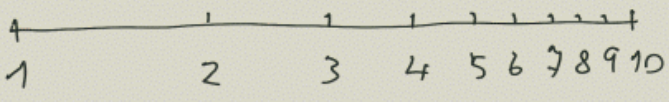


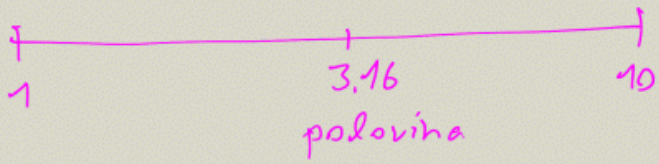
$$\log ab = \log a + \log b$$

$c_1 + c_2$ $\quad c_1$ $\quad \log_b c_2$



orejchováno v logaritmech délky



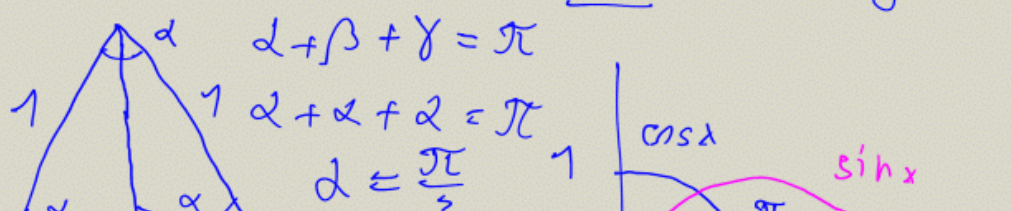


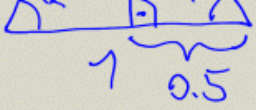
$$\frac{\log 10}{2} = \log 10^{\frac{1}{2}} = \log \sqrt{10}$$

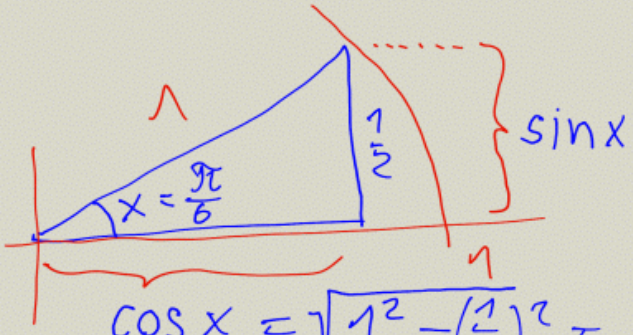
$1360 \times 81 \approx$ desetiřícího odečteme $= 11000$

tisíce desítky

Významné body sin, cos, tg



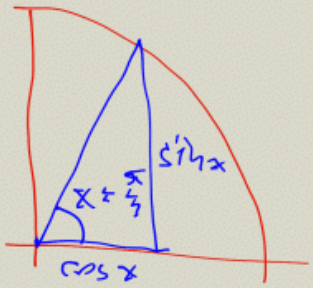




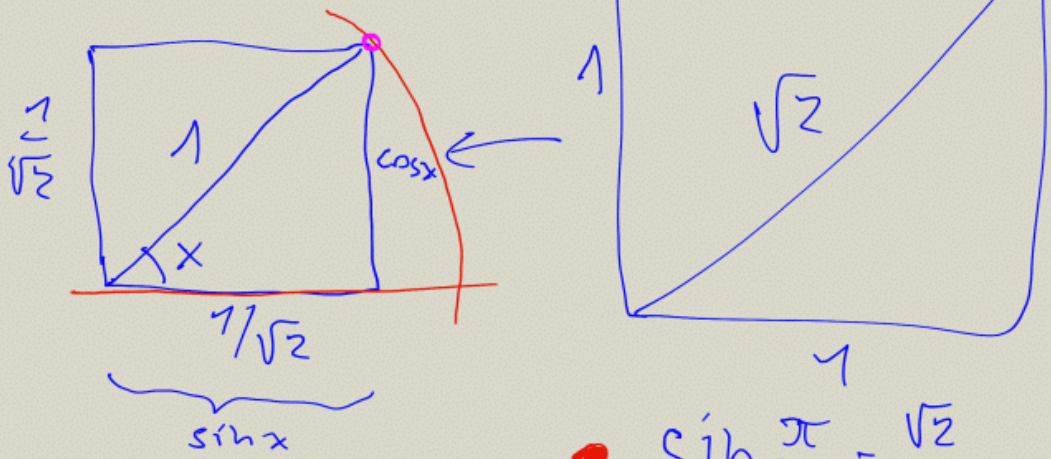
- $\sin\frac{\pi}{6} = \frac{1}{2}$
- $\cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$

$$\cos x = \sqrt{1^2 - \left(\frac{1}{2}\right)^2} = \sqrt{\frac{4-1}{4}} = \frac{\sqrt{3}}{2}$$

podobně

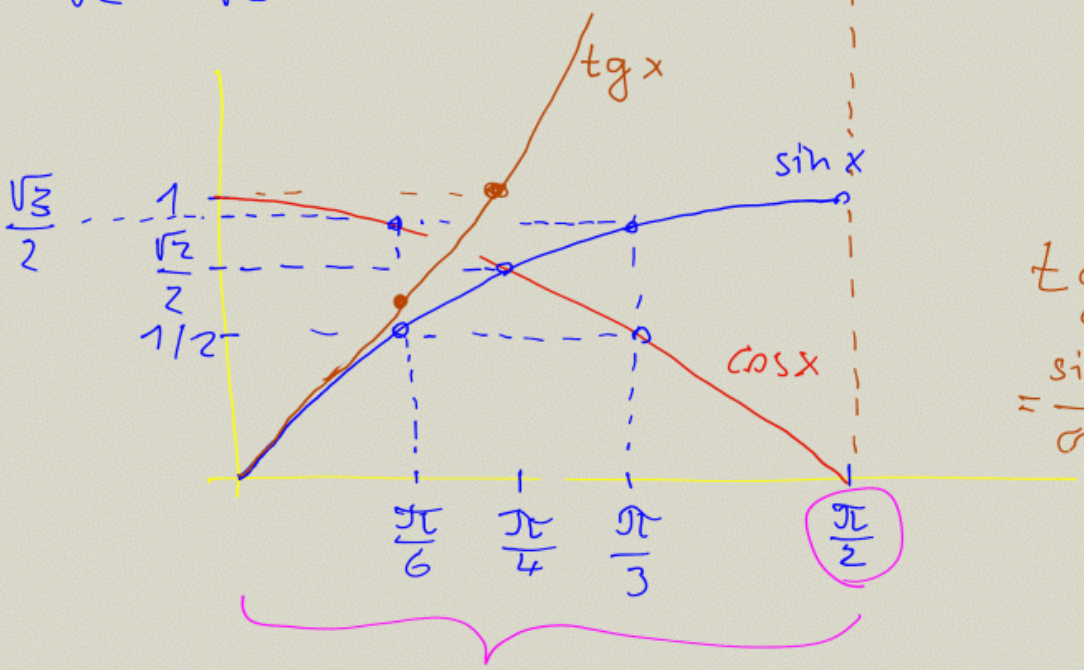


- $\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$
- $\cos\frac{\pi}{3} = \frac{1}{2}$



- $\sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$
- $\cos\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

$$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}\frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$



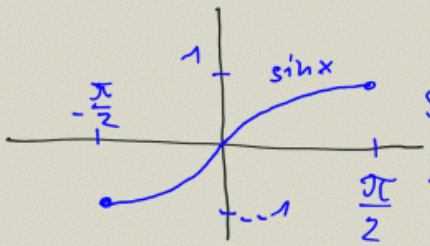
$$tg\frac{\pi}{6} = \frac{\sin\frac{\pi}{6}}{\cos\frac{\pi}{6}} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

cyklometrické funkce

- k názvosloví:

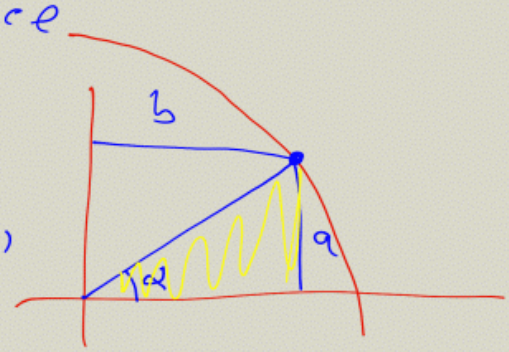
- arcsin x $(\sin^{-1} x)$

~~Jako $f^{-1}(x)$~~



$\sin x$

$\sin^{-1} x$



$tg\,\alpha = \frac{a}{b}$

na $D_f = \langle -\frac{\pi}{2}, \frac{\pi}{2} \rangle$

goniometr. $\alpha \rightarrow \frac{a}{b}$

cyklometrické $\leftarrow \frac{a}{b}$

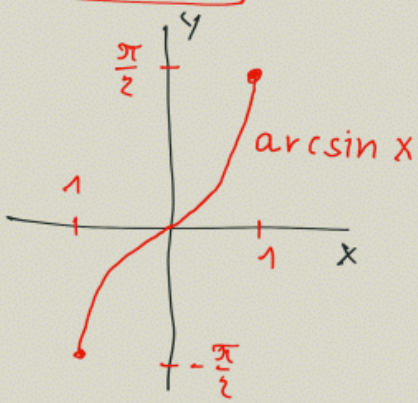
např. tg

např. arctg

arcsin x je inverzní funkce k sin x na intervalu $\langle -\frac{\pi}{2}, \frac{\pi}{2} \rangle$

$D_{arcsin} = \langle -1, 1 \rangle$

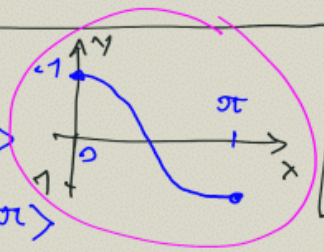
$H_{arcsin} = \langle -\frac{\pi}{2}, \frac{\pi}{2} \rangle$



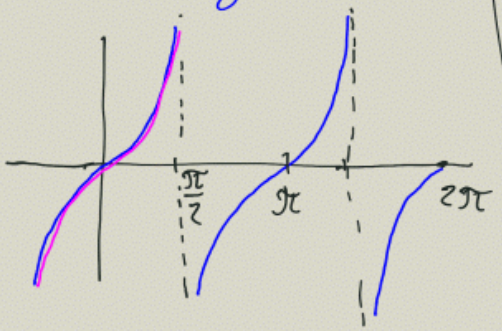
- arccos x

$D_{arccos} = \langle -1, 1 \rangle$

$H_{arccos} = \langle 0, \pi \rangle$



- arctg x



arctg je inv. funkce k tg x na $(-\frac{\pi}{2}, \frac{\pi}{2})$

$D_{arctg} = R$

$H_{arctg} = (-\frac{\pi}{2}, \frac{\pi}{2})$