

Goniometrické funkce, rovnice a nerovnice

9

• Oblouková míra:

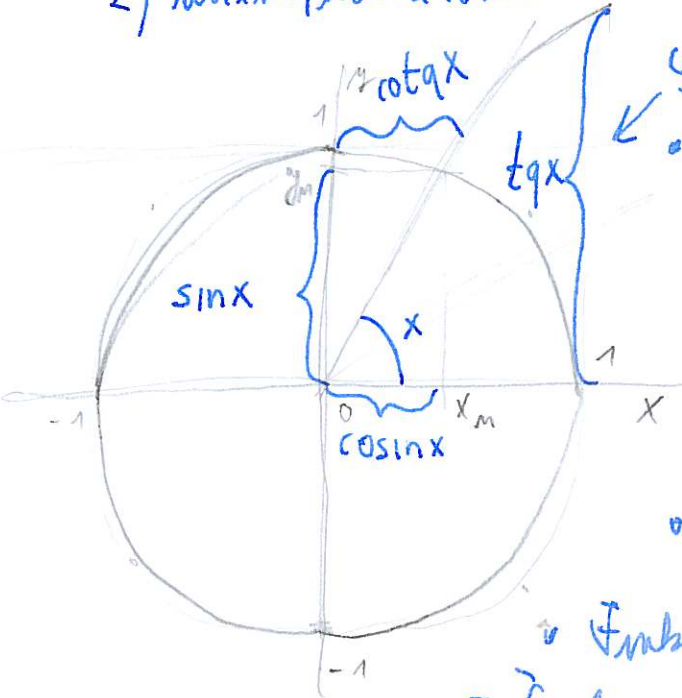
1 rad je středový úhel, který přísluší oblouku jednotkové kružnice, jehož délka je 1.

$$360^\circ = 2\pi$$

• Funkce - uvedení

1) zvolíme kartézskou soustavu Oxy a sestavíme jednotkovou kružnici se středem v O .

2) vrátíme, kde se nachází x a y ...



• Ústí obrátit a konstanty

• Funkce sinus je funkce, která každému $x \in \mathbb{R}$ přiřadí $\sin x$.

- jednotková rovnice přísluší každému úhlu x jednotkové kružnice - sinus

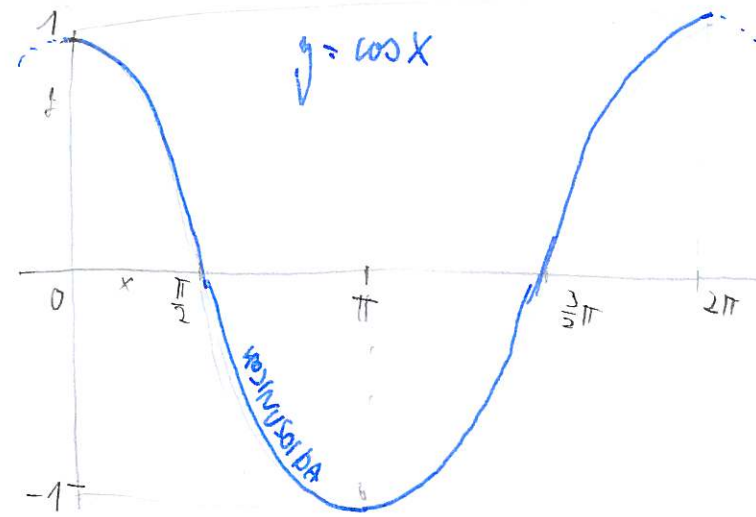
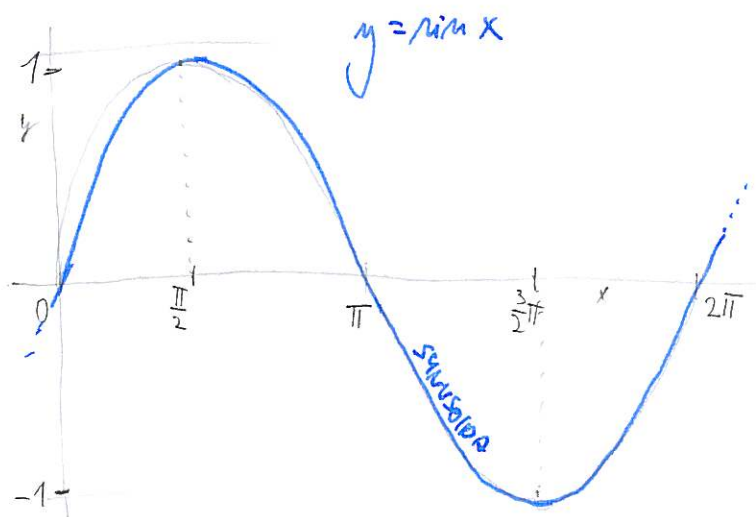
• Cosinus analogicky (x-ová s.)

• Funkce tangens je funkce daná rovnicí $y = \frac{\sin x}{\cos x}$

• Funkce cotangens je funkce daná rovnicí $y = \frac{\cos x}{\sin x}$

$$f: \sin x \quad g: \cos x$$





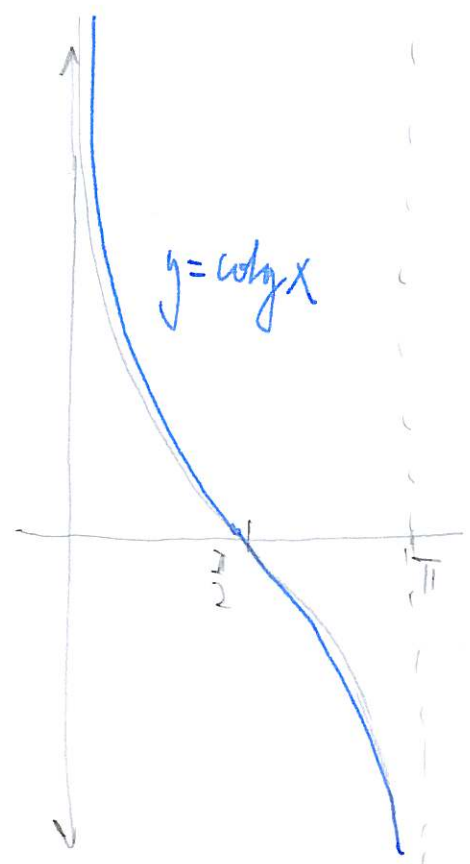
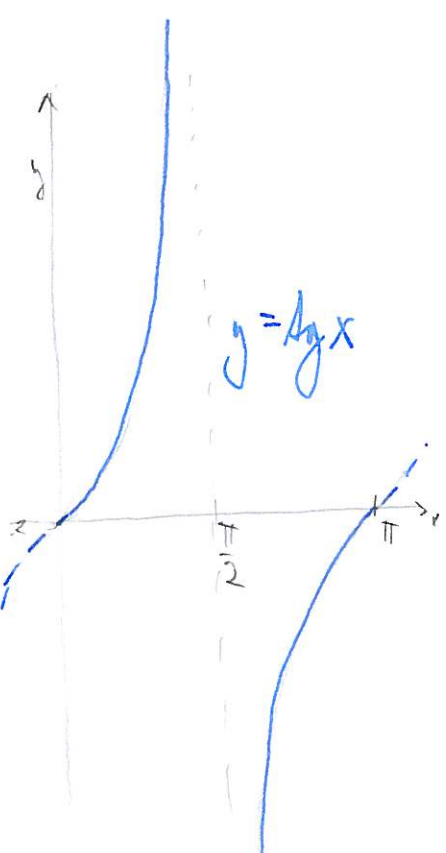
$D \subseteq \mathbb{R}$
 $H \subseteq (-1, 1)$
 shora i'ndala o'moni
 e'chibiy...
 monoton...
 |
 lishā

ruvū

~~$D \subseteq \mathbb{R}$~~ $D \subseteq \mathbb{R} - \{(2k+1) \cdot \frac{\pi}{2}\}$

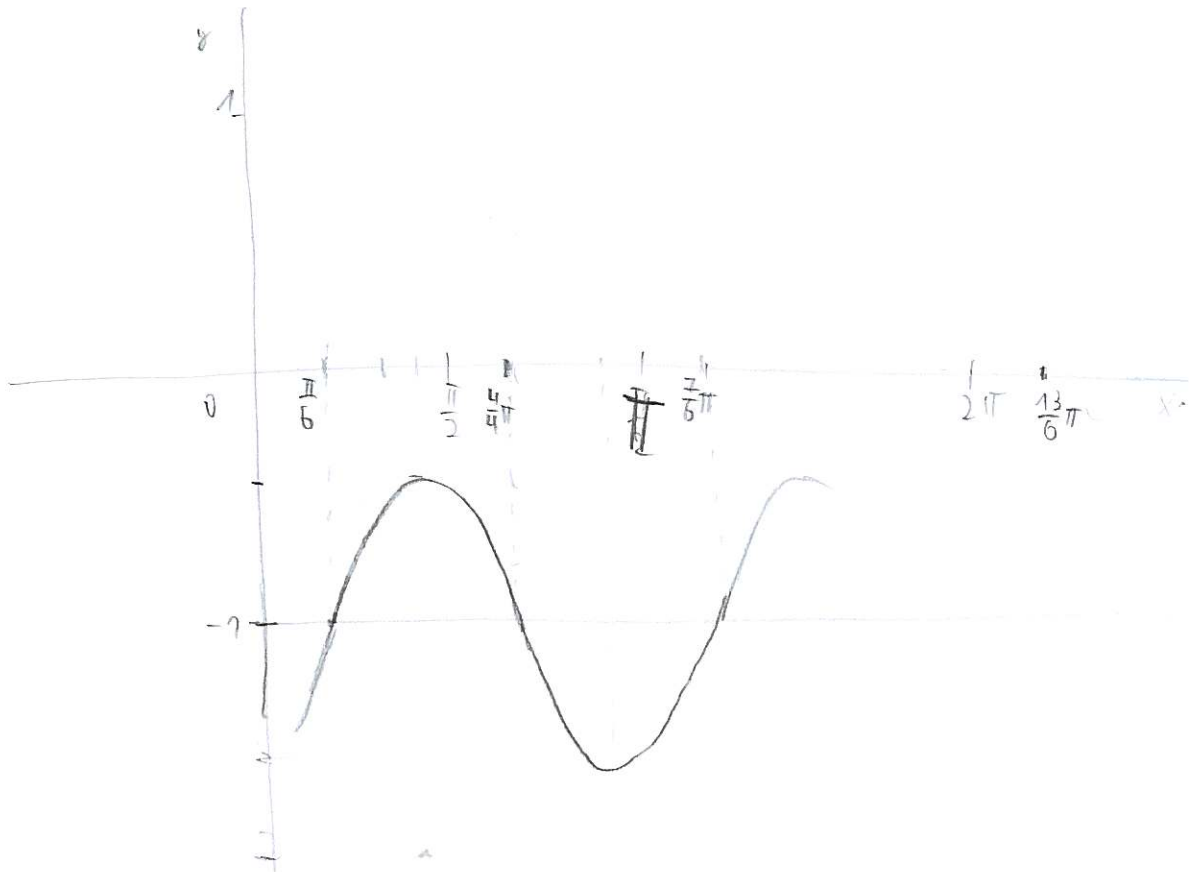
$D \subseteq \mathbb{R} - \{k\pi\} \quad k \in \mathbb{Z}$

$H \subseteq \mathbb{R}$
 neomerone
 lishā



$\vec{p}_2 := y = \frac{1}{2} \sin\left(2x - \frac{\pi}{3}\right) - 1$ \rightarrow $\mu' = \frac{\pi}{2} \dots$ *maximální perioda*

$\frac{1}{2} \sin\left(2x - \frac{\pi}{3}\right) - 1 = \frac{1}{2} \sin\left[2\left(x - \frac{\pi}{6}\right)\right] - 1$ \rightarrow *perioda ve směru osy y*
maximální amplituda \rightarrow *perioda ve směru osy x*



Rovnice

$$\sin^2 x + \cos^2 x = 1 \quad x \in \mathbb{R}$$

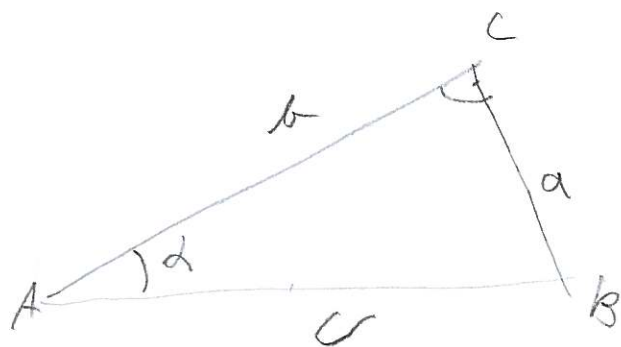
$$\tan x \cdot \cot x = 1 \quad x \neq k\frac{\pi}{2}; k \in \mathbb{Z}$$

$$\sin 2x = 2 \cdot \sin x \cdot \cos x$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\left. \begin{aligned} \sin(x+y) &= \sin x \cos y + \cos x \sin y \\ \sin(x-y) &= \sin x \cos y - \cos x \sin y \\ \cos(x+y) &= \cos x \cos y - \sin x \sin y \\ \cos(x-y) &= \cos x \cos y + \sin x \sin y \end{aligned} \right\} x, y \in \mathbb{R}$$

Goniometrické funkce v trojúhelníku

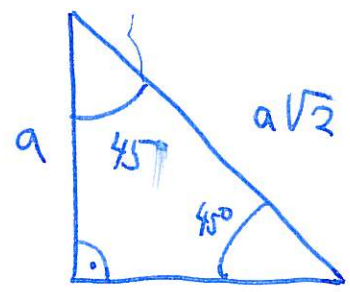
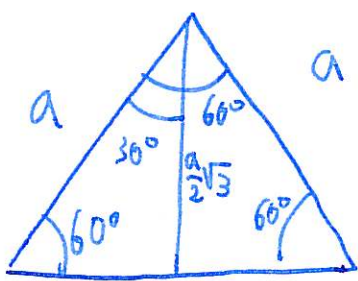
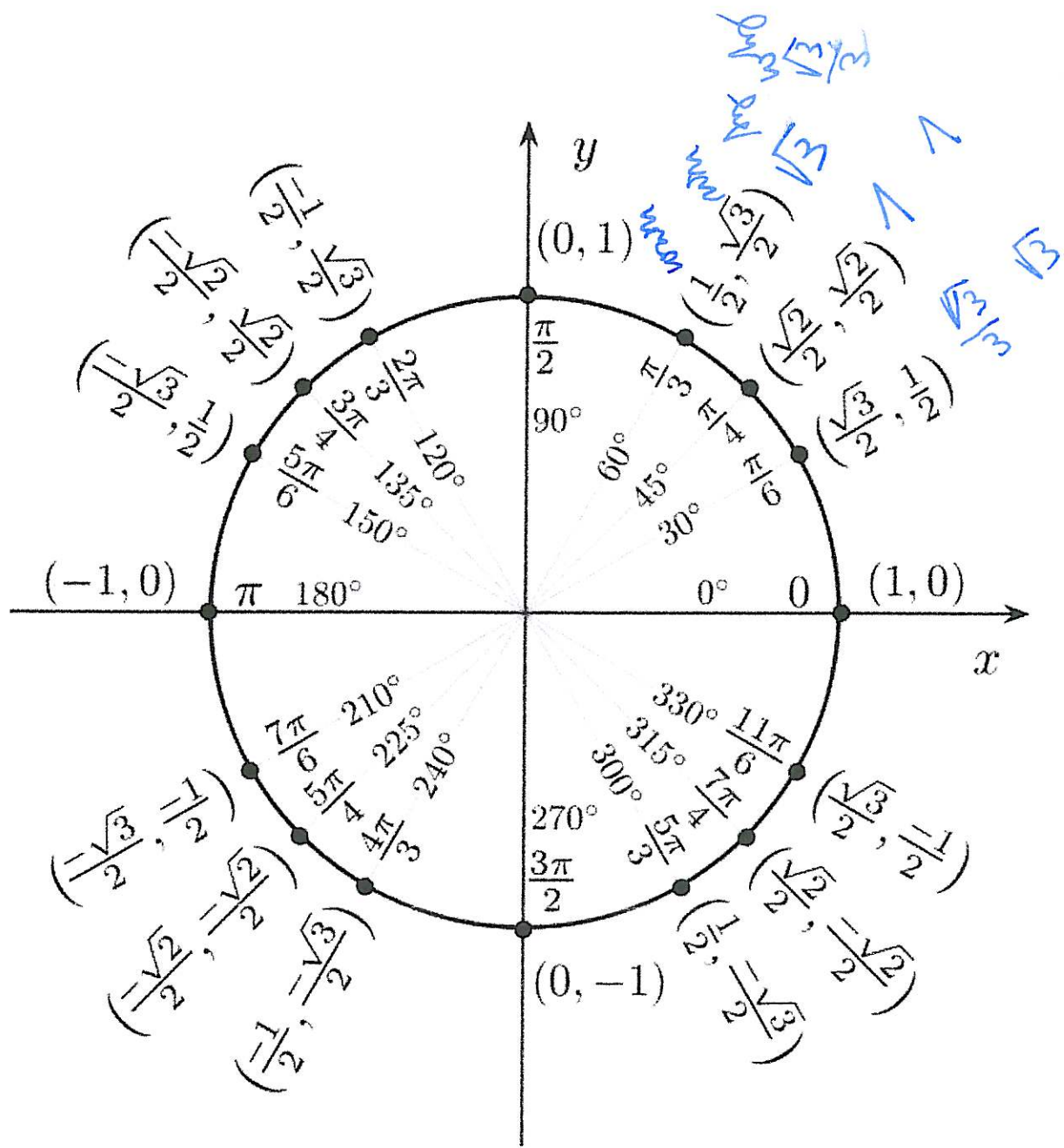


$$\sin \alpha = \frac{a}{c}$$

$$\cos \alpha = \frac{b}{c}$$

$$\tan \alpha = \frac{a}{b}$$

$$\cot \alpha = \frac{b}{a}$$



$$\sin 30^\circ = \frac{a/2}{a} = \frac{1}{2}$$

$$\cos 30^\circ = \frac{a\sqrt{3}/2}{a} = \frac{\sqrt{3}}{2}$$

$$\sin 60^\circ = \frac{a\sqrt{3}/2}{a} = \frac{\sqrt{3}}{2}$$

$$\cos 60^\circ = \frac{a/2}{a} = \frac{1}{2}$$

$$\sin 45^\circ = \frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos 45^\circ = \frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\sin 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

~~1/2~~
~~1/2~~

30° $\frac{\pi}{6}$
 45° $\frac{\pi}{4}$
 60° $\frac{\pi}{3}$
 90° $\frac{\pi}{2}$
 120° $\frac{2\pi}{3}$

$\frac{\sqrt{3}}{2}$ ~~$\frac{1}{2}$~~
 $\frac{\sqrt{2}}{2}$ $\frac{1}{2}$
 $\frac{1}{2}$ $\frac{\sqrt{3}}{2}$
~~1~~ ~~1~~

~~$\frac{\sqrt{3}}{2}$~~
 $\frac{1}{2}$
 $\sqrt{3}$
1

$\frac{\sqrt{3}}{2}$
 $\frac{1}{2}$
 $\frac{\sqrt{3}}{2}$
0