MATEMATIKA 30.5.2022

1. Určete základní velikost úhlu: $\alpha = \frac{35\pi}{4} \rightarrow \frac{3\pi}{4}$

$\beta = -768° \rightarrow 312°$

2. Převeďte na uvedenou jednotku: $\frac{47\pi}{12} rad = \underline{\quad 705 \quad}°$

$74° = \underline{\quad 1{,}29 \quad} rad \qquad \frac{47}{90}\pi \ rad$

3. Určete přesně: $\sin\frac{11}{6}\pi = -\frac{1}{2}$ $\qquad \cos\left(-\frac{35\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

$tg(-150°) = \frac{\sqrt{3}}{3}$ $\qquad cotg\frac{16\pi}{3} = \frac{\sqrt{3}}{3}$

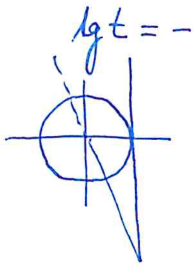
4. Napište všechna řešení rovnic v R *(podmínky)*:

a) $\sqrt{3}.tg\left(2x - \frac{\pi}{4}\right) = -3$

$2x - \frac{\pi}{4} \neq \frac{\pi}{2} + k\pi \rightarrow \boxed{x \neq \frac{3\pi}{8} + k.\frac{\pi}{2};\ k \in Z}$

$2x - \frac{\pi}{4} = t$

$tg\, t = -\frac{3}{\sqrt{3}} = -\sqrt{3}$



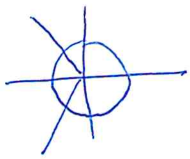
$t = \frac{2\pi}{3} + k.\pi$

$2x - \frac{\pi}{4} = \frac{2\pi}{3} + k.\pi \rightarrow 2x = \frac{11\pi}{12} + k\pi \rightarrow$

$\boxed{x = \frac{11\pi}{24} + k.\frac{\pi}{2};\ k \in Z}$

b) $\frac{\sqrt{2}}{cos\left(\frac{1}{2}x + \frac{\pi}{2}\right)} = -2$

$\frac{x}{2} + \frac{\pi}{2} \neq \frac{\pi}{2} + k\pi \rightarrow \boxed{x \neq 2k\pi;\ k \in Z}$



$\frac{x}{2} + \frac{\pi}{2} = t$

$\frac{\sqrt{2}}{\cos t} = -2 \rightarrow \cos t = -\frac{\sqrt{2}}{2} \rightarrow t_1 = \frac{3\pi}{4} + 2k\pi;\ t_2 = \frac{5\pi}{4} + 2k\pi$

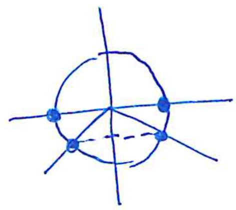
$\frac{x}{2} + \frac{\pi}{2} = \frac{3\pi}{4} + 2k\pi \rightarrow x_1 = \frac{\pi}{2} + 4k\pi$

$\frac{x}{2} + \frac{\pi}{2} = \frac{5\pi}{4} + 2k\pi \rightarrow x_2 = \frac{3\pi}{2} + 4k\pi$

$k \in Z$

c) $2.sin^2x + sinx = 0$

$\sin x(2\sin x + 1) = 0 \iff \sin x = 0 \lor \sin x = -\frac{1}{2}$



$x_1 = k.\pi$

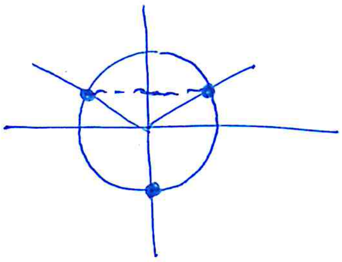
$x_2 = \frac{7\pi}{6} + 2k\pi \quad k \in Z$

$x_3 = \frac{11\pi}{6} + 2k\pi$

5. **Další goniometrické rovnice řešené substitucí** *(kde je třeba, uvádíme podmínky)*:

a) $2sin^2x + sinx - 1 = 0$ $\quad \sin x = t \rightarrow 2t^2 + t - 1 = 0 \rightarrow t_{1,2} = \frac{-1 \pm \sqrt{9}}{4} = \left\langle \begin{array}{l} \frac{1}{2} \\ -1 \end{array} \right.$

$\sin x = \frac{1}{2}$; $\sin x = -1$

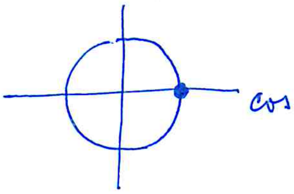


$\rightarrow \boxed{x = \frac{\pi}{6} + k \cdot \frac{2\pi}{3} ;\ k \in Z}$

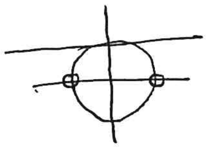
b) $cos^2x + 2.cosx = 3$ $\quad \cos x = t \rightarrow t^2 + 2t - 3 = 0 \rightarrow t_{1,2} = \frac{-2 \pm \sqrt{16}}{2} = \left\langle \begin{array}{l} 1 \\ -3 \end{array} \right.$

$\cos x = -3 \rightarrow \emptyset$

$\cos x = 1 \rightarrow \boxed{x = k \cdot 2\pi ;\ k \in Z}$



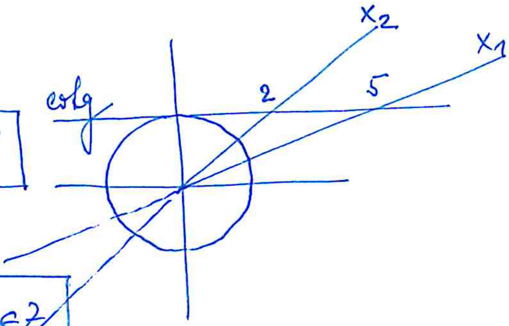
c) $7cotgx = cotg^2x + 10$ $\quad \mathrm{cotg}\, x = t$ $\quad \boxed{x \neq k \cdot \pi ;\ k \in Z}$



$t^2 - 7t + 10 = 0 \rightarrow t_{1,2} = \frac{7 \pm \sqrt{9}}{2} = \left\langle \begin{array}{l} 5 \\ 2 \end{array} \right.$

$\mathrm{cotg}\, x = 5 \rightarrow \mathrm{tg}\, x = \frac{1}{5} \rightarrow \boxed{x_1 \doteq 11{,}31^\circ + k \cdot 180^\circ ;\ k \in Z}$

(kalkulačka)



$\mathrm{cotg}\, x = 2 \rightarrow \mathrm{tg}\, x = \frac{1}{2} \rightarrow \boxed{x_2 \doteq 26{,}57^\circ + k \cdot 180^\circ ;\ k \in Z}$

Cvičení 6 v Teams

Sbírka str. 173 – 174