Esercitazione tutoraggio diffuso Analisi 1 (Settimana dal 21 al 25 ottobre)

Esercizio 1. Risolvere le seguenti equazioni:

- $\cos x = 0$ **R.** $x = \frac{\pi}{2} + k\pi, k \in \mathbb{Z}$
- $\sin x = 1$ **R.** $x = \frac{\pi}{2} + 2k\pi, k \in \mathbb{Z}$
- $\cos 3x = 0$ **R.** $x = \frac{\pi}{6} + \frac{k}{3}\pi, k \in \mathbb{Z}$
- $\sin 8x = -1$ **R.** $x = -\frac{\pi}{16} + \frac{\pi}{4}k, k \in \mathbb{Z}$
- $\tan x = -1$ **R.** $x = -\frac{\pi}{4} + k\pi, k \in \mathbb{Z}$
- $\sin 2x = 0$ **R.** $x = k\frac{\pi}{2}, k \in \mathbb{Z}$
- $\tan x = \frac{\sqrt{3}}{3}$ **R.** $x = \frac{\pi}{6} + k\pi, k \in \mathbb{Z}$
- $\cos^2 x = \frac{1}{2}$ **R.** $x = \frac{\pi}{4} + k\frac{\pi}{2}, k \in \mathbb{Z}$
- $\cos^2 x + \cos x + 1 = 0$ **R.** $\varnothing$
- $\sin^4 x - \sin^2 x = 0$ **R.** $x = k\frac{\pi}{2}, k \in \mathbb{Z}$
- $\tan^2 x - \tan x = 0$ **R.** $x = k\pi \vee x = \frac{\pi}{4} + k\pi, k \in \mathbb{Z}$
- $\sin^2 x = \frac{1}{2}$ **R.** $x = \frac{\pi}{4} + k\frac{\pi}{2}, k \in \mathbb{Z}$
- $\sin^4 x + \sin^2 x + 1 = 0$ **R.** $\varnothing$**.**

Esercizio 2. Risolvere le seguenti equazioni lineari in seno e coseno:

- $\sin x + \cos x = 1$ **R.** $x = 2k\pi \vee x = \frac{\pi}{2} + 2k\pi, k \in \mathbb{Z}$
- $\sin x + \cos x = 0$ **R.** $x = \frac{\pi}{2} + k\pi$ **non è soluzione.**

Esercizio 3. Risolvere le seguenti equazioni e disequazioni (metodo grafico):

- $\cos x < 1$ **R.** $\forall x \in \mathbb{R} \setminus \{2k\pi, k \in \mathbb{Z}\}$
- $\cos^2 x \leq 0$ **R.** $x = \frac{\pi}{2} + k\pi, k \in \mathbb{Z}$
- $|\cos x| < 1$ **R.** $x \neq k\pi, k \in \mathbb{Z}$
- $\cos 5x > 0$ **R.** $-\frac{\pi}{10} + \frac{2\pi}{5}k < x < \frac{\pi}{10} + \frac{2\pi}{5}k, k \in \mathbb{Z}$

- $\cos x < \frac{1}{2}$ **R.** $\frac{\pi}{3} + 2k\pi < x < \frac{5}{3}\pi + 2k\pi, k \in \mathbb{Z}$
- $\cos x > \frac{\sqrt{2}}{2}$ **R.** $-\frac{\pi}{4} + 2k\pi < x < \frac{\pi}{4} + 2k\pi, k \in \mathbb{Z}$
- $\tan^2 x - \tan x > 0$ **R.** $-\frac{\pi}{2} + k\pi < x < k\pi \vee \frac{\pi}{4} + k\pi < x < \frac{\pi}{2} + k\pi, k \in \mathbb{Z}$
- $\sin^2 x + \sin x \geq 0$ **R.** $2k\pi \leq x \leq \pi + 2k\pi, k \in \mathbb{Z}$
- $\sqrt{\sin^2 x} = 1$ **R.** $x = \pm\frac{\pi}{2} + 2k\pi, k \in \mathbb{Z}$
- $\sin^2 x < 1$ **R.** $x \neq \pm\sqrt{\frac{\pi}{2} + k\pi}, k \in \mathbb{N} \cup \{0\}$
- $\arcsin x = 0$ **R.** $x = 0$
- $\arcsin x = 1$ **R.** $x = \sin 1$
- $\arccos x = 0$ **R.** $x = 1$
- $\arccos x = 1$ **R.** $x = \cos 1$
- $\arccos x > 0$ **R.** $-1 \leq x < 1$
- $\arccos x \geq 0$ **R.** $-1 \leq x \leq 1$
- $\arctan x \geq 0$ **R.** $x \geq 0$
- $\arctan x - 1 = 0$ **R.** $x = \tan 1$
- $\arctan |x| \geq 0$ **R.** $\forall x \in \mathbb{R}$
- $\arctan(1 + x^2) > 0$ **R.** $\forall x \in \mathbb{R}$.