

# RISOLUZIONE EQUAZIONI LINEARI (1° grado)

$$\sqrt{3} \sin x + \cos x = \sqrt{3}$$

## 1. Metodo Algebrico

$$\sin x = \frac{2t}{1+t^2} \quad \cos x = \frac{1-t^2}{1+t^2} \quad t = \tan \frac{x}{2} \quad \frac{x}{2} = \frac{\pi}{2} + k\pi \rightarrow x = \pi + 2k\pi$$

$$\frac{2\sqrt{3}t}{1+t^2} + \frac{1-t^2}{1+t^2} = \sqrt{3}$$

$$2\sqrt{3}t + 1 - t^2 - \sqrt{3} - \sqrt{3}t^2 = 0$$

$$-(1+\sqrt{3})t^2 + 2\sqrt{3}t + 1 - \sqrt{3} = 0$$

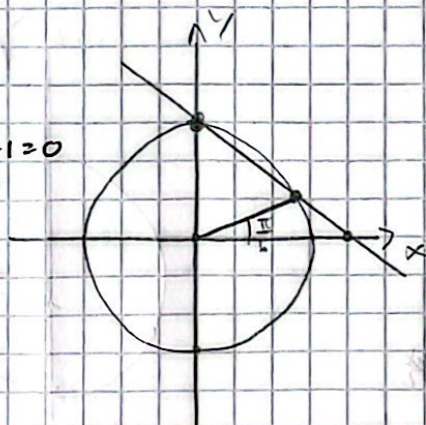
$$t_{1,2} = \frac{-\sqrt{3} \pm \sqrt{3+1-3}}{-(1+\sqrt{3})} = \frac{-\sqrt{3} \pm 1}{-(1+\sqrt{3})} = \frac{1}{1-\sqrt{3}} \cdot \frac{(-\sqrt{3}+1)(-\sqrt{3}+1)}{(-\sqrt{3}-1)(-\sqrt{3}+1)} = \frac{9+1-2\sqrt{3}}{3-1} = \frac{4-2\sqrt{3}}{2} = 2-\sqrt{3}$$

$$\tan \frac{x}{2} = 1 \quad \frac{x}{2} = \frac{\pi}{4} + k\pi \quad x = \frac{\pi}{2} + 2k\pi$$

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

## 2. Metodo Grafico

$$\begin{cases} x^2 + y^2 = 1 \\ \sqrt{3}y + x = \sqrt{3} \end{cases} \quad \begin{cases} 3y^2 + 3 - 8y + y^2 - 1 = 0 \\ x = -\sqrt{3}y + \sqrt{3} \end{cases}$$



$$x = \frac{\pi}{6} + 2k\pi$$

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

$$\begin{cases} 2y^2 - 8y + 1 = 0 \\ x = -\sqrt{3}y + \sqrt{3} \end{cases}$$

$$y = \frac{3 \pm \sqrt{9-8}}{2} = \frac{3 \pm 1}{2} = \frac{1}{2}$$

## 3. Metodo dell'Angolo Aggiunto (Asin(x+d))

$$\sqrt{3} \sin x + \cos x = \sqrt{3} \rightarrow 2 \sin\left(x + \frac{\pi}{6}\right) = \sqrt{3}$$

$$A = \sqrt{3+1} = 2$$

$$\alpha : \tan \alpha = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\sin\left(x + \frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$$

$$\alpha = \frac{\pi}{6}$$

$$x + \frac{\pi}{6} = \frac{\pi}{3} + 2k\pi \vee x + \frac{\pi}{6} = \frac{2}{3}\pi + 2k\pi$$

$$x = \frac{\pi}{6} + 2k\pi$$

$$x = \frac{4\pi - \pi}{6} + 2k\pi = \frac{3}{6}\pi + 2k\pi = \frac{1}{2}\pi$$