

1. $\text{sen}^2 x - \text{sen} x = 0$

$$\text{sen} x (\text{sen} x - 1) = 0 \quad \left| \begin{array}{l} \text{sen} x = 0 \\ \text{sen} x = 1 \end{array} \right. \quad \begin{array}{l} x = k \pi \\ x = \frac{\pi}{2} + 2 k \pi \end{array}$$

2. $\text{ctg}^2 \left(x + \frac{\pi}{4} \right) + \sqrt{3} \text{ctg} \left(x + \frac{\pi}{4} \right) = 0$

Pongo $x + \frac{\pi}{4} = t$ e l'equazione diventa: $\text{ctg}^2 t + \sqrt{3} \text{ctg} t = 0$

$$\text{ctg} t (\text{ctg} t + \sqrt{3}) = 0 \quad \left| \begin{array}{ll} \text{ctg} t = 0 & t = \frac{\pi}{2} + k \pi \\ \text{ctg} t = -\sqrt{3} & t = \frac{5}{6} \pi + k \pi \end{array} \right. \quad \begin{array}{ll} x + \frac{\pi}{4} = \frac{\pi}{2} + k \pi & x = \frac{\pi}{4} + k \pi \\ x + \frac{\pi}{4} = \frac{5}{6} \pi + k \pi & x = \frac{7}{12} \pi + k \pi \end{array}$$

3. $\text{sen}^2 x + \text{sen} x - \cos^2 x = 0$

$$\text{sen}^2 x + \text{sen} x - (1 - \text{sen}^2 x) = 0$$

$$\text{sen}^2 x + \text{sen} x - 1 + \text{sen}^2 x = 0$$

$$2 \text{sen}^2 x + \text{sen} x - 1 = 0$$

$$\text{sen} x = \frac{-1 \pm \sqrt{1+8}}{4} = \begin{cases} \frac{1}{2} \\ -1 \end{cases} \quad \begin{array}{l} \text{sen} x = \frac{1}{2} \\ \text{sen} x = -1 \end{array}$$

$$\begin{array}{l} x = \frac{\pi}{6} + 2k\pi; \quad x = \frac{5}{6}\pi + 2k\pi \\ x = \frac{3}{2}\pi + 2k\pi \end{array}$$

4. $\text{sen}^2 x - 3 \text{sen} x + 2 = 0$

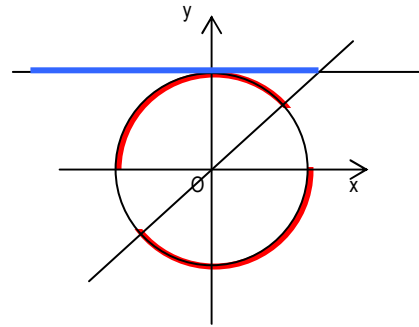
$$\text{sen} x = \frac{3 \pm \sqrt{9-8}}{2} = \begin{cases} 2 \\ 1 \end{cases} \quad \begin{array}{l} \text{sen} x = 2 \text{ imp.} \\ \text{sen} x = 1 \end{array}$$

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

5. $\operatorname{ctg}\left(x - \frac{\pi}{4}\right) < 1$

$$\frac{\pi}{4} + k\pi < x - \frac{\pi}{4} < \pi + k\pi$$

$$\frac{\pi}{2} + k\pi < x < \frac{5}{4}\pi + k\pi$$

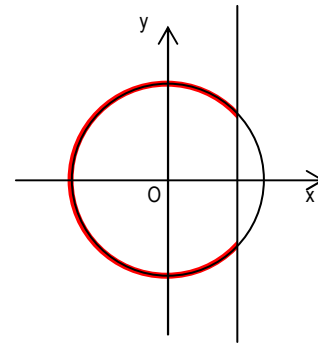


6. $2 \cos\left(\frac{x}{2} - \frac{\pi}{2}\right) - \sqrt{2} < 0$

$$\cos\left(\frac{x}{2} - \frac{\pi}{2}\right) < \frac{\sqrt{2}}{2}$$

$$\frac{\pi}{4} + 2k\pi < \frac{x}{2} - \frac{\pi}{2} < \frac{7}{4}\pi + 2k\pi$$

$$\frac{3}{4}\pi + 2k\pi < \frac{x}{2} < \frac{9}{4}\pi + 2k\pi$$



$$\frac{3}{2}\pi + 4k\pi < x < \frac{9}{2}\pi + 4k\pi$$

7. $\operatorname{sen}\left(x + \frac{\pi}{4}\right) + \cos\left(x + \frac{\pi}{4}\right) + 1 < 0$

Si tratta di una disequazione lineare, che può essere risolta graficamente:

$$\begin{cases} Y + X + 1 = 0 \\ X^2 + Y^2 = 1 \end{cases} \quad \begin{cases} X = -Y - 1 \\ Y^2 + 2Y + 1 + Y^2 = 1 \end{cases}$$

$$\operatorname{sen}\left(x + \frac{\pi}{4}\right) = Y \quad \cos\left(x + \frac{\pi}{4}\right) = X$$

$$\begin{cases} X = -Y - 1 \\ 2Y^2 + 2Y = 0 \end{cases}$$

$$\begin{cases} X = -1 \\ Y = 0 \end{cases} \quad x + \frac{\pi}{4} = \pi + 2k\pi$$

$$\begin{cases} X = 0 \\ Y = -1 \end{cases} \quad x + \frac{\pi}{4} = \frac{3}{2}\pi + 2k\pi$$

$$\pi + 2k\pi < x + \frac{\pi}{4} < \frac{3}{2}\pi + 2k\pi$$

$$\frac{3}{4}\pi + 2k\pi < x < \frac{5}{4}\pi + 2k\pi$$

