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$$\frac{tg\,x + sen\,x}{\cos x} = 2\left(tg\,x - sen\,x\right)\left(1 + \frac{1}{\cos x}\right)$$

$$C.E = \left\{x \in \mathbb{R} \;/\; \cos x \neq 0\right\} \Rightarrow \left\{x \in \mathbb{R} \;/\; x \neq \frac{\pi}{2} + k\pi \quad k \in \mathbb{N}\right\}.$$

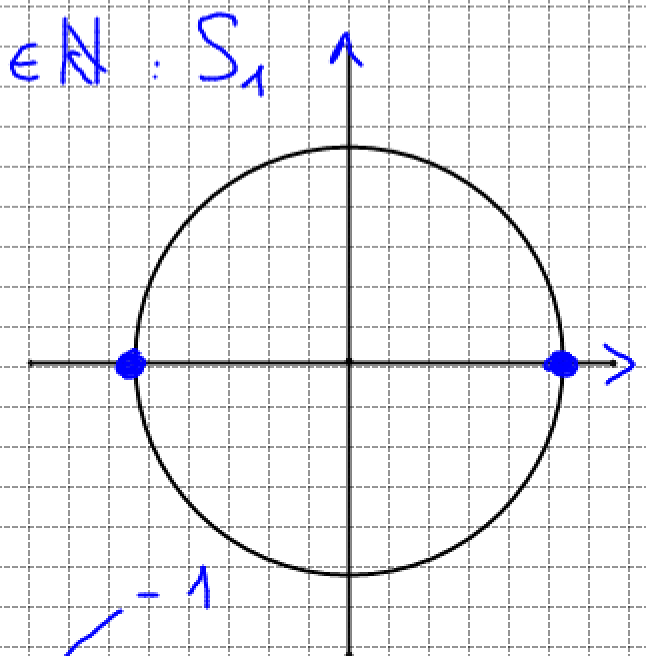
$$\frac{sen\,x + sen\,x\cos x}{\cancel{\cos^2 x}} = 2\left(\frac{sen\,x - sen\,x\cos x}{\cancel{\cos x}}\right)\left(\frac{\cos x + 1}{\cancel{\cos x}}\right)$$

$$sen\,x + sen\,x\cos x = 2\,\cancel{sen\,x\cos x} + 2\,sen\,x - 2\,sen\,x\cos^2 x - \cancel{2\,sen\,x\cos x}$$

$$-sen\,x + sen\,x\cos x + 2\,sen\,x\cos^2 x = 0$$

$$sen\,x\left(2\cos^2 x + \cos x - 1\right) = 0 \quad \begin{cases} sen\,x = 0 & (1) \\ 2\cos^2 x + \cos x - 1 = 0 & (2) \end{cases}$$

(1) $sen\,x = 0 \qquad x = 0 + k\pi \quad k \in \mathbb{N} \; : \; S_1$



(2) $2\cos^2 x + \cos x - 1 = 0$

$$\cos x_{1,2} = \frac{-1 \pm \sqrt{1+8}}{4} = \frac{-1 \pm 3}{4} = \begin{cases} -1 \\ \frac{1}{2} \end{cases}$$

$$\left.\begin{array}{ll} \cos x = -1 & x = \pi + 2k\pi \quad k \in \mathbb{N} \\ \cos x = \frac{1}{2} & x = \frac{\pi}{3} + 2k\pi \;\cup\; x = \frac{5}{3}\pi + 2k\pi \quad k \in \mathbb{N} \end{array}\right\} S_2$$

$$S_T : \; x = 0 + k\pi \;\cup\; x = \pi + 2k\pi \;\cup\; x = \frac{\pi}{3} + 2k\pi \;\cup\; x = \frac{5}{3}\pi + 2k\pi \quad k \in \mathbb{N}$$

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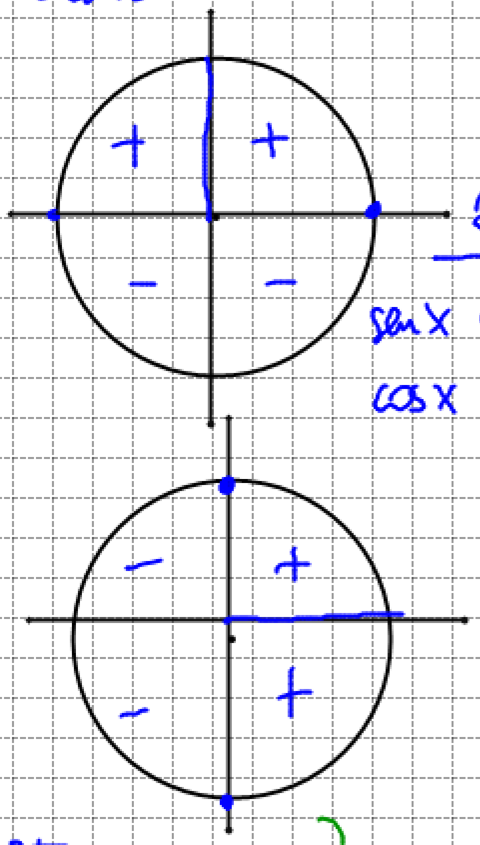
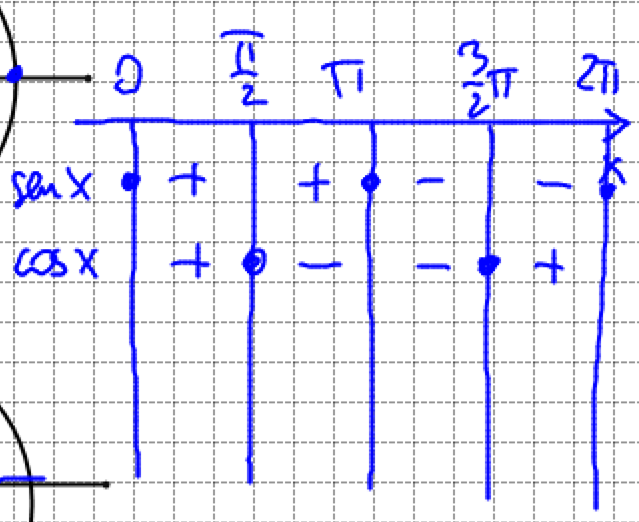
$$|\operatorname{sen} x| = |\cos x|$$

Studio il segno dei due moduli:

$\operatorname{sen} x \geq 0$

$\cos x \geq 0$





- se $0 \leq x < \frac{\pi}{2} \cup \pi \leq x < \frac{3\pi}{2}$

  $\operatorname{sen} x = \cos x \iff -\operatorname{sen} x = -\cos x$ ①

- se $\frac{\pi}{2} \leq x \leq \pi \cup \frac{3}{2}\pi \leq x < 2\pi$

  $\operatorname{sen} x = -\cos x \iff -\operatorname{sen} x = \cos x$ ②

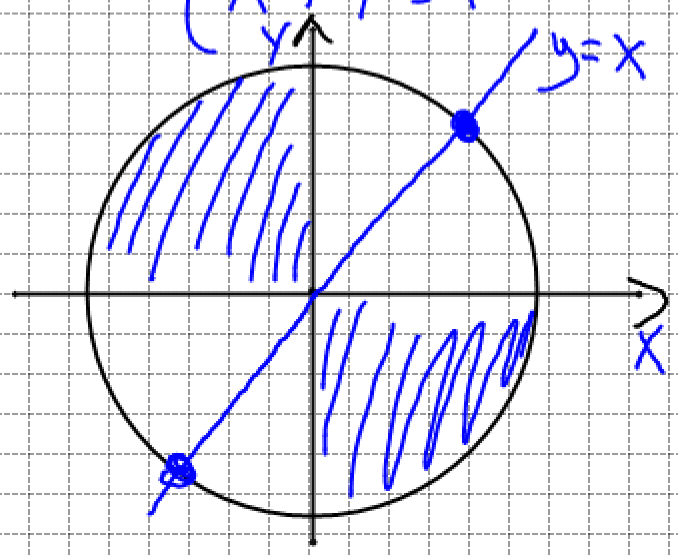
① se $0 \leq x < \frac{\pi}{2} \cup \pi \leq x < \frac{3}{2}\pi$

$$\operatorname{sen} x = \cos x$$

$$\operatorname{sen} x - \cos x = 0$$

R.G.: $\begin{cases} \operatorname{sen} x = Y \\ \cos x = X \\ \operatorname{sen}^2 x + \cos^2 x = 1 \end{cases} \Rightarrow \begin{cases} Y - X = 0 \\ X^2 + Y^2 = 1 \end{cases}$

S_1: $x = \frac{\pi}{4} + k\pi \quad k \in \mathbb{N}$

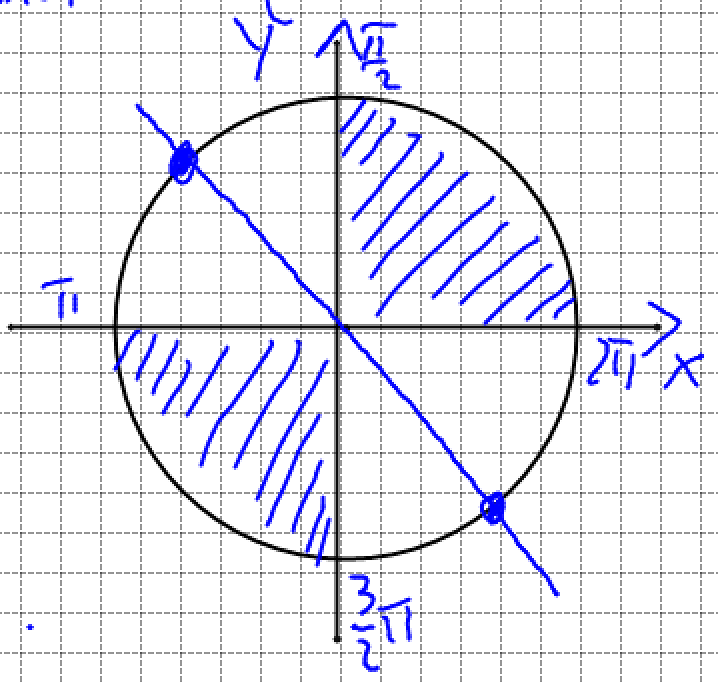


② per $\frac{\pi}{2} \leq x < \pi \cup \frac{3}{2}\pi \leq x < 2\pi$

$\operatorname{sen} x = -\cos x \qquad \operatorname{sen} x + \cos x = 0$

R.G. poniamo $\begin{cases} \operatorname{sen} x = Y \\ \cos x = X \\ \operatorname{sen}^2 x + \cos^2 x = 1 \end{cases}$ $\begin{cases} Y + X = 0 \\ X^2 + Y^2 = 1 \end{cases}$

S_2 $x = \frac{3}{4}\pi + k\pi \quad k \in \mathbb{N}$



S_T = $x = \frac{\pi}{4} + k\frac{\pi}{2} \quad k \in \mathbb{N}$

oppure

$x = \frac{\pi}{4} + k\pi \cup x = \frac{3}{4}\pi + k\pi \quad k \in \mathbb{N}$

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$$tg\left(\arcsin\left(-\frac{5}{13}\right)\right) = ?$$

$$\arcsin\left(-\frac{5}{13}\right) = \alpha \Rightarrow \sin\alpha = -\frac{5}{13} \qquad \sin^2\alpha = \frac{25}{169}$$

$$1-\cos^2\alpha = \frac{25}{169} \qquad \cos^2\alpha = 1-\frac{25}{169} \qquad \cos^2\alpha = \frac{144}{169}$$

$$\cos\alpha = +\frac{12}{13} \qquad tg\left(\arcsin\left(-\frac{5}{13}\right)\right) = Tg\,\alpha = \frac{\sin\alpha}{\cos\alpha} = -\frac{5}{12}$$

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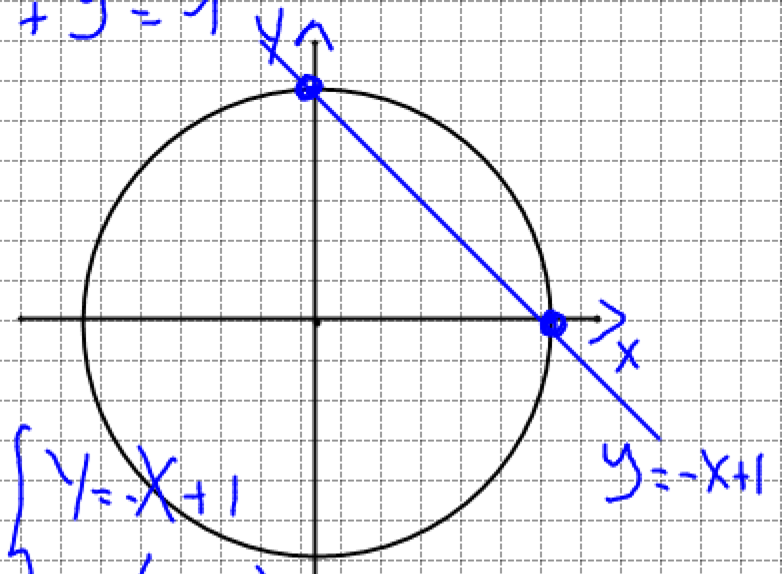
$\operatorname{sen} x + \cos x - 1 = 0$

R.G.: $\begin{cases} \operatorname{sen} x = Y \\ \cos x = X \\ \operatorname{sen}^2 x + \cos^2 x = 1 \end{cases}$ $\quad \begin{cases} Y + X - 1 = 0 \\ X^2 + Y^2 = 1 \end{cases}$ $(\bullet)$



$x = 0 + 2k\pi \cup x = \frac{\pi}{2} + 2k\pi \quad k \in \mathbb{N}$

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

$\begin{cases} X = 0 \\ Y = 1 \end{cases} \cup \begin{cases} Y = 0 \\ X = 1 \end{cases} \Rightarrow \begin{cases} \cos x = 0 \\ \operatorname{sen} x = 1 \end{cases} \quad x = \frac{\pi}{2} + 2k\pi \quad k \in \mathbb{N}$

$\cup$

$\begin{cases} \operatorname{sen} x = 0 \\ \cos x = 1 \end{cases} \quad x = 0 + 2k\pi \quad k \in \mathbb{N}$

$\operatorname{sen} x + \cos x - 1 = 0$

R.A.: poniamo $\begin{cases} \operatorname{sen} x = \frac{2t}{1+t^2} \\ \cos x = \frac{1-t^2}{1+t^2} \end{cases}$ $\quad t = \operatorname{Tg} \frac{x}{2} = \frac{\operatorname{sen} \frac{x}{2}}{\cos \frac{x}{2}}$

$\cos \frac{x}{2} \neq 0 \Rightarrow \frac{x}{2} \neq \frac{\pi}{2} + k\pi \quad k \in \mathbb{N} \Rightarrow x \neq \pi + 2k\pi \quad k \in \mathbb{N}$

Verifico se $x = \pi + 2k\pi$ $k \in \mathbb{N}$ è soluzione dell'equazione $\operatorname{sen} x + \cos x - 1 = 0$: $\quad \operatorname{sen} \pi + \cos \pi - 1 = 0 \quad 0 - 1 - 1 = 0$

$-2 = 0$ No!

$\frac{2t}{1+t^2} + \frac{1-t^2}{1+t^2} - 1 = 0 \quad 2t + \cancel{1} - t^2 - \cancel{1} - t^2 = 0$

$-2t^2 + 2t = 0 \quad 2t(-t+1) = 0 \quad \begin{cases} t = 0 \\ t = 1 \end{cases}$

$t = 0 \quad \operatorname{Tg} \frac{x}{2} = 0 \Rightarrow \frac{x}{2} = 0 + k\pi \quad k \in \mathbb{N} \Rightarrow$

$S_1: \; x = 0 + 2k\pi \quad k \in \mathbb{N}$

$t = 1 \quad \operatorname{Tg} \frac{x}{2} = 1 \Rightarrow \frac{x}{2} = \frac{\pi}{4} + k\pi \quad k \in \mathbb{N} \Rightarrow x = \frac{\pi}{2} + 2k\pi \quad k \in \mathbb{N} \; (S_2)$

$S_T: \; x = 0 + 2k\pi \cup x = \frac{\pi}{2} + 2k\pi \quad k \in \mathbb{N}$