CURVE DELTIPO $y = a\sin x + b\cos x \quad (a,b \in \mathbb{R})$

$$y = a\sin x + b\cos x$$

$$y = \sqrt{a^2+b^2}\left(\frac{a}{\sqrt{a^2+b^2}}\sin x + \frac{b}{\sqrt{a^2+b^2}}\cos x\right)$$

$$-1 \leq \quad \leq 1 \qquad -1 \leq \quad \leq 1$$

$$\cos\alpha = \frac{a}{\sqrt{a^2+b^2}} \; ; \; \sin\alpha = \frac{b}{\sqrt{a^2+b^2}}$$

$$y = \sqrt{a^2+b^2}\left(\cos\alpha\sin x + \sin\alpha\cos x\right)$$

$$\boxed{y = \sqrt{a^2+b^2}\,\sin(x+\alpha)}$$

ESEMPIO

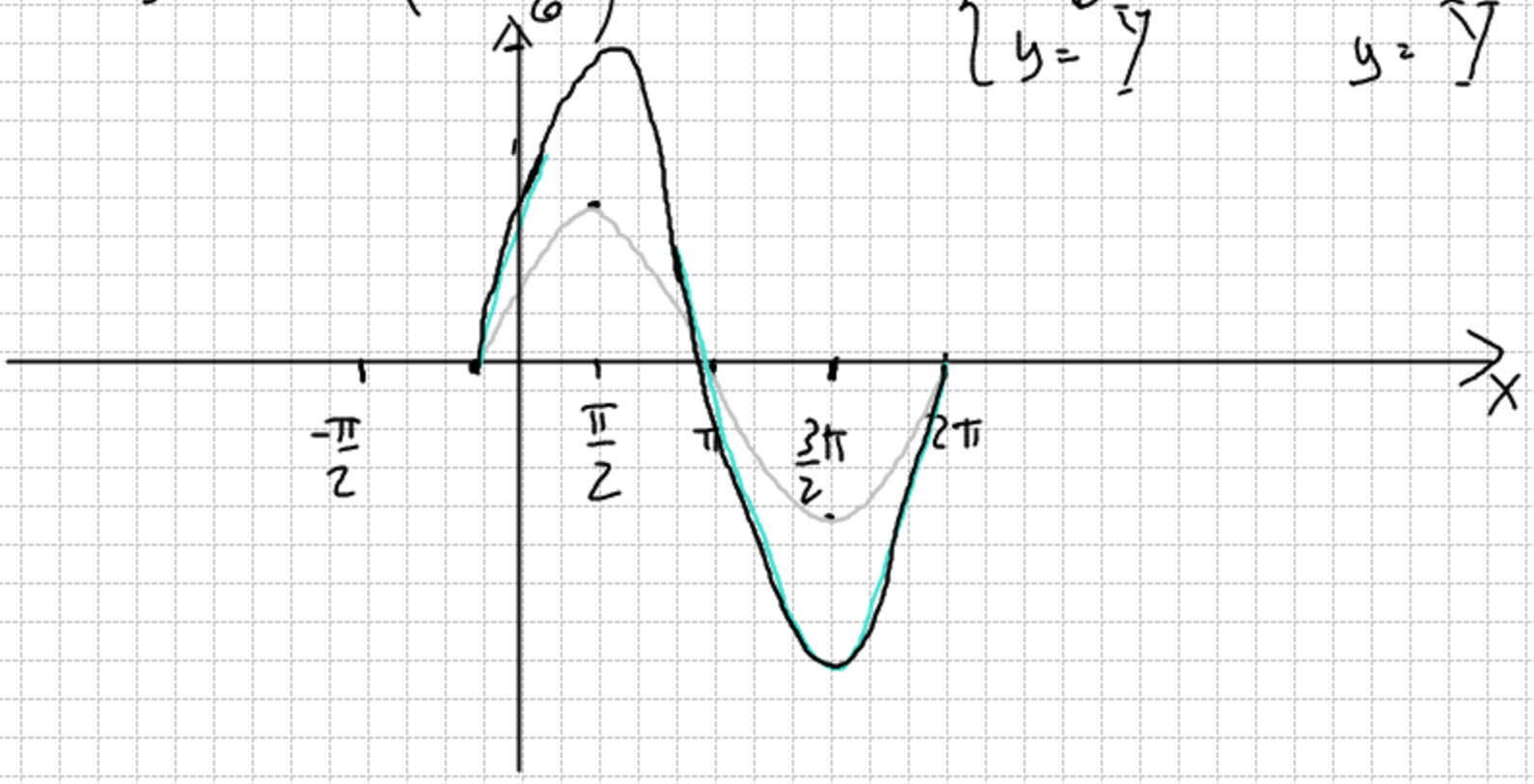
$$y = \sqrt{3}\sin x + \cos x \qquad a = \sqrt{3} \quad b = 1$$

$$\sqrt{a^2+b^2} = \sqrt{4} = 2$$

$$y = 2\left(\frac{\sqrt{3}}{2}\sin x + \frac{1}{2}\cos x\right) \qquad \left.\begin{array}{l}\cos\alpha = \frac{\sqrt{3}}{2} \\ \sin\alpha = \frac{1}{2}\end{array}\right\} \Leftrightarrow \alpha = \frac{\pi}{6}$$

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

$$y = 2\sin\left(x+\frac{\pi}{6}\right) \qquad \begin{cases} x+\frac{\pi}{6} = X \\ y = Y \end{cases} \qquad \begin{array}{l} x = X - \frac{\pi}{6} \\ y = Y \end{array}$$



ESEMPIO

$$y = \operatorname{sen} x - \cos x + 3$$

$$y - 3 = \operatorname{sen} x - \cos x$$

$$y - 3 = \sqrt{a^2+b^2}\left(\frac{a}{\sqrt{a^2+b^2}}\operatorname{sen} x + \frac{b}{\sqrt{a^2+b^2}}\cos x\right)$$

$$\begin{cases} a = 1 \\ b = 1 \end{cases}$$

$$\sqrt{a^2+b^2} = \sqrt{2}$$

$$\begin{cases} \cos\alpha = \frac{\sqrt{2}}{2} \\ \operatorname{sen}\alpha = \frac{\sqrt{2}}{2} \end{cases} \quad \alpha = \frac{\pi}{4}$$

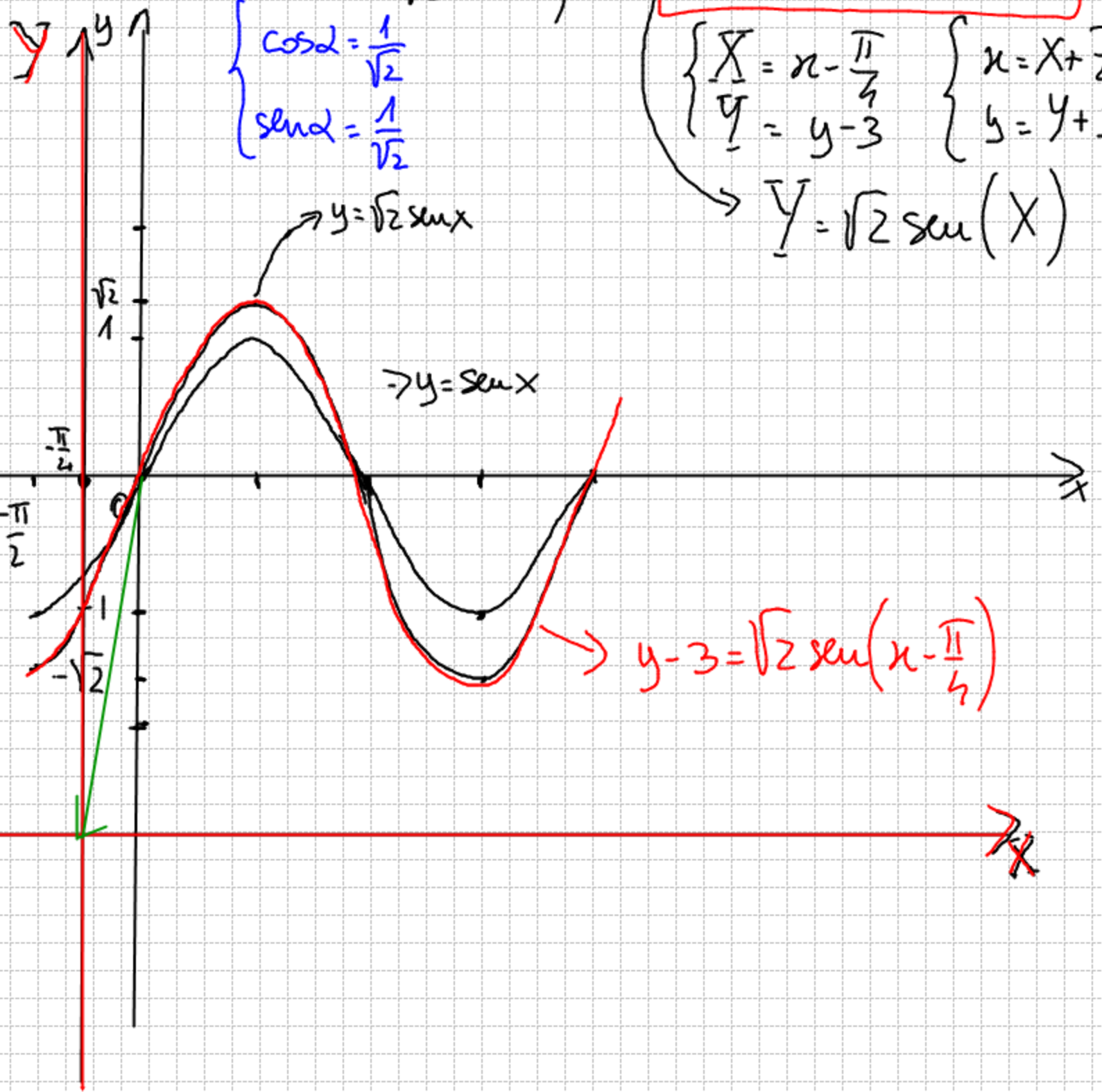
$$y - 3 = \sqrt{2}\left(\frac{1}{\sqrt{2}}\operatorname{sen} x - \frac{1}{\sqrt{2}}\cos x\right)$$

$$\begin{cases} \cos\alpha = \frac{1}{\sqrt{2}} \\ \operatorname{sen}\alpha = \frac{1}{\sqrt{2}} \end{cases}$$

$$y - 3 = \sqrt{2}\operatorname{sen}\left(x - \frac{\pi}{4}\right)$$

$$\begin{cases} \underline{X} = x - \frac{\pi}{4} \\ \underline{Y} = y - 3 \end{cases} \qquad \begin{cases} x = X + \frac{\pi}{4} \\ y = Y + 3 \end{cases}$$

$$\underline{Y} = \sqrt{2}\operatorname{sen}(X)$$



$$\rightarrow y - 3 = \sqrt{2}\operatorname{sen}\left(x - \frac{\pi}{4}\right)$$