106) f) $\begin{cases} 2(\sin^4 x + \cos^4 x) = 1 \\ -\pi \leq x \leq \pi \end{cases}$

$\cos^2 x = 1 - \operatorname{sen}^2 x$

$\therefore$

$2(\sin^4 x + \cos^4 x) = 1$

$2(\sin^4 x + (\cos^2 x)^2) = 1$

$(\sin^4 x + (1 - \sin^2 x)^2) = \frac{1}{2}$

$\sin^4 x + 1 - 2\sin^2 x + \sin^4 x = \frac{1}{2}$

$2\sin^4 x - 2\sin^2 x + \frac{1}{2} = 0$

$\sin^4 x - \sin^2 x + \frac{1}{4} = 0$

Seja

$y = \sin^2 x$

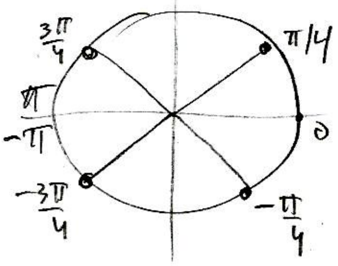
Então

$y^2 - y + \frac{1}{4} = 0$

$y = \left(1 \pm \sqrt{1 - 4 \cdot \frac{1}{4}}\right) / 2$

$y = \frac{1}{2}$

$\therefore \begin{cases} \sin^2 x = \frac{1}{2} \Rightarrow \sin x = \pm \frac{1}{\sqrt{2}} \\ \text{com} \\ -\pi \leq x \leq \pi \end{cases}$



Solução

$\boxed{x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}}$

107.

$\begin{cases} 2\operatorname{tg} x \cos^2 x + \sin x \operatorname{tg} x - 2\operatorname{tg} x = 0 \\ \text{com} \quad |x| < 2\pi \Leftrightarrow -2\pi < x < 2\pi \end{cases}$

$2\operatorname{tg} x \cos^2 x + \sin x \operatorname{tg} x - 2\operatorname{tg} x = 0$

$\operatorname{tg} x (2\cos^2 x + \sin x - 2) = 0$

$\operatorname{tg} x (2(1 - \sin^2 x) + \sin x - 2) = 0$

$\operatorname{tg} x (\cancel{2} - 2\sin^2 x + \sin x - \cancel{2}) = 0$

$\operatorname{tg} x (-2\sin^2 x + \sin x) = 0$

$\operatorname{tg} x (\sin x (-2\sin x + 1)) = 0$

$\Rightarrow \begin{cases} \operatorname{tg} x = 0 \\ \text{ou} \\ \sin x = 0 \\ \text{ou} \\ \sin x = \frac{1}{2} \end{cases}$