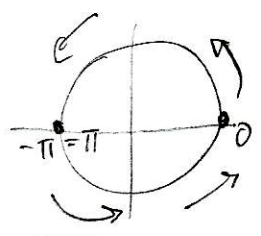


a) $\cos 2x = \cos^2 x ; -\pi \leq x \leq \pi$

$\cos^2 x - \sin^2 x = \cos^2 x$

$\sin^2 x = 0 \Rightarrow x = -\pi, 0, \pi$

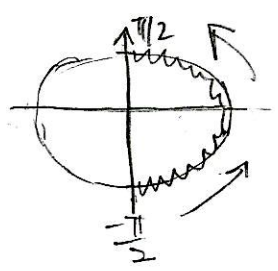


b) $\sin 2x = \cos x ; -\pi \leq 2x \leq \pi$

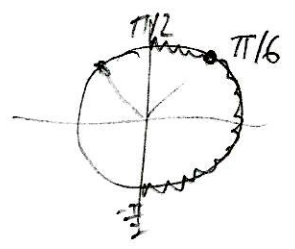
$$\begin{cases} 2 \sin x \cos x = \cos x & -\frac{\pi}{2} \leq x \leq \frac{\pi}{2} \\ \cos x (2 \sin x - 1) = 0 \end{cases}$$

$$\Rightarrow \begin{cases} \cos x = 0 \\ \text{or} \\ \sin x = \frac{1}{2} \end{cases}$$

$\cos x = 0 \Rightarrow x = -\frac{\pi}{2}, \frac{\pi}{2}$



$\sin x = \frac{1}{2} \Rightarrow x = \frac{\pi}{6}$



$x = -\frac{\pi}{2}, \frac{\pi}{6}, \frac{\pi}{2}$

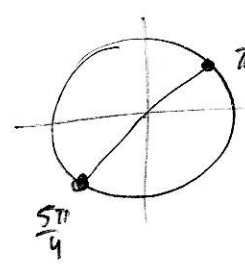
c)
$$\begin{cases} \cos^2 x - 2 \sin x \cos x - \sin^2 x = 0 \\ 0 \leq 2x \leq \pi \end{cases}$$

$\cos^2 x - 2 \sin x \cos x - \sin^2 x = 0$

$\cos^2 x - \sin^2 x - 2 \sin x \cos x = 0$

$\cos 2x - \sin 2x = 0$

$\cos 2x = \sin 2x$



$\Rightarrow 2x = \frac{\pi}{4}, \frac{5\pi}{4}$

$2x \in [0, \pi]$

$\Rightarrow 2x = \frac{\pi}{4}$

$x = \frac{\pi}{8}$

d)
$$\begin{cases} \text{tg } 2x = 8 \cos^2 x - \cot x \\ 0 \leq x \leq \frac{\pi}{2} \quad (x \neq \frac{\pi}{4}) \end{cases}$$

$\text{tg } 2x + \cot x = 8 \cos^2 x$

$\frac{2 \text{tg } x}{1 - \text{tg}^2 x} + \frac{1}{\text{tg } x} = 8 \cos^2 x$

$2 \text{tg}^2 x + 1 - \text{tg}^2 x = 8 \cos^2 x$

$\text{tg } x (1 - \text{tg}^2 x)$

$\frac{\text{tg}^2 x + 1}{\text{tg } x (1 - \text{tg}^2 x)} = 8 \cos^2 x$

$\text{tg } x (1 - \text{tg}^2 x)$