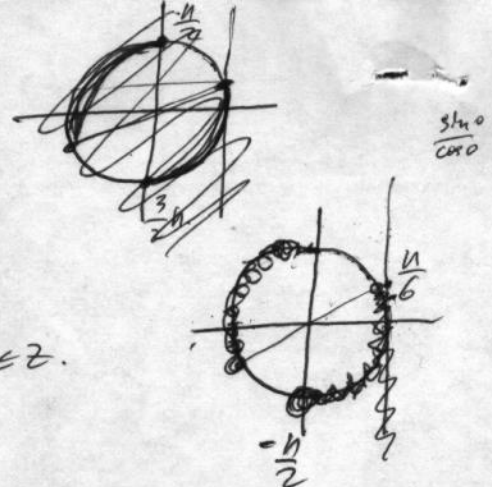


$$1) \quad \arccos\left(3x + \frac{\pi}{6}\right) < \frac{\sqrt{3}}{3}$$

$$\begin{aligned} -\frac{\pi}{2} &< 3x + \frac{\pi}{6} < \frac{\pi}{6} \\ -\frac{2}{3}\pi &< 3x < 0 \\ -\frac{\pi}{3} &< x < 0 \end{aligned}$$

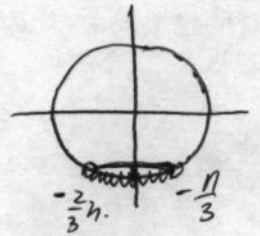
$$\begin{aligned} -\frac{\pi}{2} + 2k\pi &< 3x + \frac{\pi}{6} < \frac{\pi}{6} + 2k\pi \\ -\frac{2}{3}\pi + 2k\pi &< 3x < 0 + 2k\pi \\ -\frac{2}{9}\pi + \frac{2k\pi}{3} &< x < \frac{\pi}{3}, \quad n \in \mathbb{Z} \end{aligned}$$



$$2) \quad \sin \frac{x}{2} < -\frac{\sqrt{3}}{2}$$

$$\begin{aligned} -\frac{2}{3}\pi &< \frac{x}{2} < -\frac{\pi}{3} \\ -\frac{4}{3}\pi &< x < -\frac{2}{3}\pi \end{aligned}$$

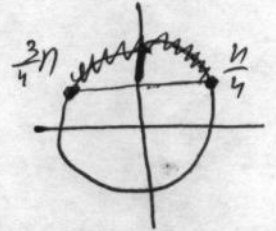
$$\begin{aligned} -\frac{2}{3}\pi + 2k\pi &< \frac{x}{2} < -\frac{\pi}{3} + 2k\pi \\ -\frac{4}{3}\pi + 4k\pi &< x < -\frac{2}{3}\pi + 4k\pi, \quad n \in \mathbb{Z} \end{aligned}$$



$$3) \quad \sin 4x \geq \frac{\sqrt{2}}{2}$$

$$\begin{aligned} \frac{3}{4}\pi &\leq 4x \leq \frac{\pi}{4} \\ \frac{3}{16}\pi &\leq x \leq \frac{\pi}{16} \end{aligned}$$

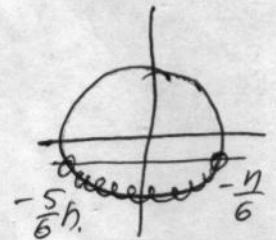
$$\begin{aligned} \frac{3}{4}\pi + 2k\pi &\leq 4x \leq \frac{\pi}{4} + 2k\pi \\ \frac{3}{16}\pi + \frac{k\pi}{2} &\leq x \leq \frac{\pi}{16} + \frac{k\pi}{2}, \quad m \in \mathbb{Z} \end{aligned}$$



$$4) \quad \cos \frac{\pi}{8} \cos x - \sin \frac{\pi}{8} \sin x < -\frac{\sqrt{3}}{2}$$

$$\cos\left(\frac{\pi}{8} + x\right) < -\frac{\sqrt{3}}{2}$$

$$\begin{aligned} -\frac{5}{6}\pi + 2k\pi &< \frac{\pi}{8} + x < -\frac{\pi}{6} + 2k\pi \\ -\frac{23}{24}\pi + 2k\pi &< x < -\frac{7}{24}\pi + 2k\pi \end{aligned}$$



$$\begin{aligned} -\frac{5}{6}\pi - \frac{\pi}{8} &= -\frac{40-6}{48} = -\frac{34}{48} \\ -\frac{46}{48} &= -\frac{23}{24} \\ -\frac{\pi}{6} - \frac{\pi}{8} &= -\frac{7-6}{48} = -\frac{1}{48} \\ -\frac{14}{48} &= -\frac{7}{24} \end{aligned}$$