

$$6) \sin^2 \frac{x}{2} = \cos^2 \frac{x}{2} - \cos^2 \frac{x}{2} + \sin^2 \frac{x}{2} - \sin^2 \frac{x}{2} = 0.$$

$$2 \sin^2 \frac{x}{2} - \sin^2 \frac{x}{2} = 0.$$

$$\sin \frac{x}{2} (2 \sin \frac{x}{2} - 1) = 0.$$

$$\sin \frac{x}{2} = 0$$

$$\frac{x}{2} = \pi n$$

$$x = 2\pi n, n \in \mathbb{Z}$$

$$\sin \frac{x}{2} = \frac{1}{2}$$

$$\frac{x}{2} = \frac{\pi}{6} + 2\pi n \Rightarrow x = \frac{\pi}{3} + 4\pi n$$

$$\frac{x}{2} = \frac{5\pi}{6} + 2\pi n \Rightarrow x = \frac{5\pi}{3} + 4\pi n$$



$$2) \sin 2x = -2 \cos x (1 + \sin x) = -2 \cos x - 2 \sin x \cos x = -2 \cos x - \sin 2x \Rightarrow$$

$$\Rightarrow 2 \sin 2x + 2 \cos x = 0 : 2.$$

$$2 \sin x \cos x + \cos x = 0 \quad \text{for } \cos x \neq 0.$$

$$\cos x (2 \sin x + 1) = 0.$$

$$\cos x = 0$$

$$x = \frac{\pi}{2} + \pi n$$

$$\sin x = -\frac{1}{2}$$

$$x = -\frac{\pi}{6} + 2\pi n$$

$$x = -\frac{5\pi}{6} + 2\pi n$$

с учетом ОПЗ:

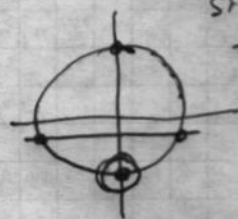
$$x = \frac{\pi}{2} + 2\pi n, n \in \mathbb{Z}.$$

$$a) \cos(x + \frac{\pi}{3}) < \frac{\sqrt{3}}{2}.$$

$$\frac{\pi + 2\pi n}{3} < x + \frac{\pi}{3} < \frac{11\pi}{6} + 2\pi n.$$

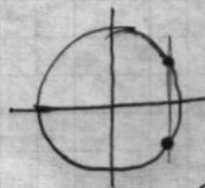
$$2\pi n < x < \frac{3\pi}{2} + 2\pi n$$

ОПЗ:  
 $\sin x \neq -1$   
 $-\pi + \frac{\pi}{6} =$



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

$$\frac{11\pi}{6}$$



$$\frac{11\pi}{6} - \frac{11\pi}{6} =$$

$$\frac{3\pi}{2}$$