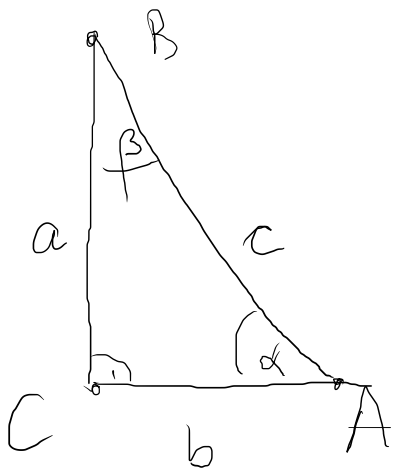


TRIGONOMETRIJA



$$c^2 = a^2 + b^2$$

$$\alpha + \beta = \frac{\pi}{2} \Rightarrow \beta = \frac{\pi}{2} - \alpha$$

$$\sin \alpha = \frac{a}{c} = \cos \beta = \cos \left(\frac{\pi}{2} - \alpha \right)$$

$$\cos \alpha = \frac{b}{c} = \sin \beta = \sin \left(\frac{\pi}{2} - \alpha \right)$$

$$\operatorname{ctg} \alpha = \frac{a}{b} = \operatorname{ctg} \beta = \operatorname{ctg} \left(\frac{\pi}{2} - \alpha \right)$$

$$\operatorname{ctg} \alpha = \frac{b}{a} = \operatorname{tg} \beta = \operatorname{tg} \left(\frac{\pi}{2} - \alpha \right)$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

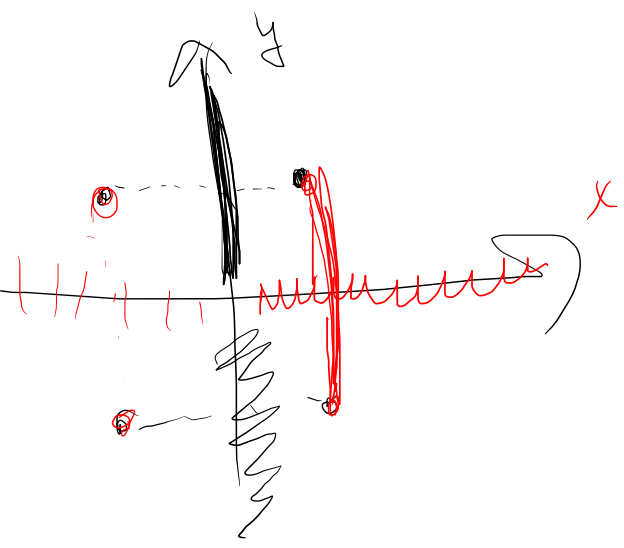
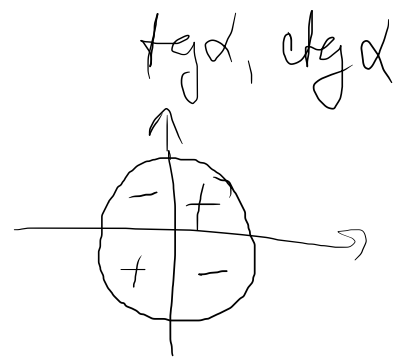
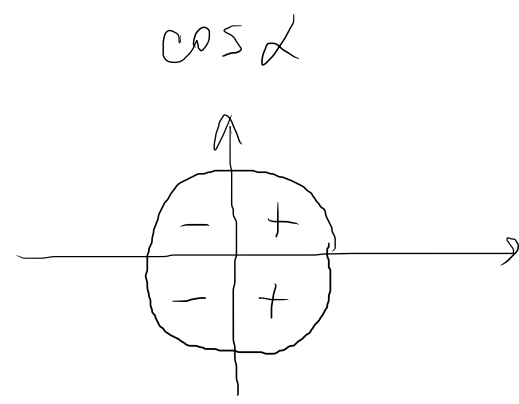
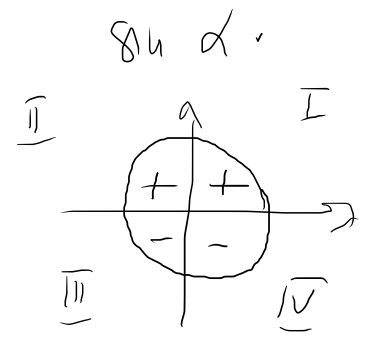
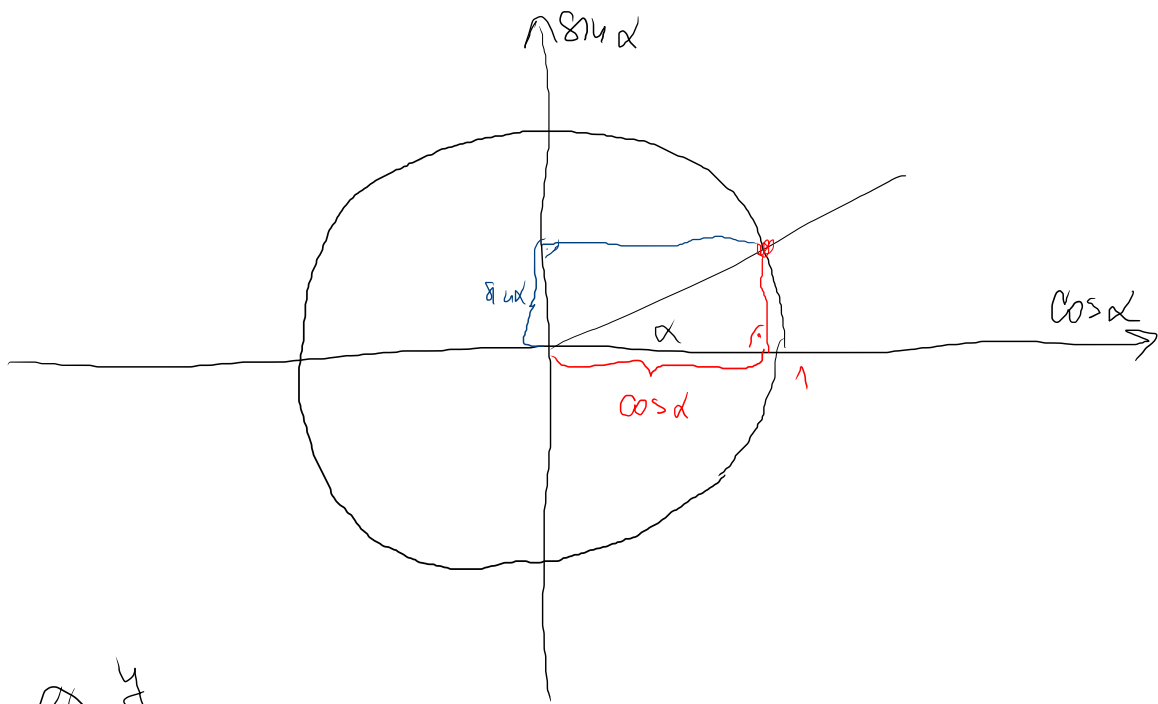
$$\operatorname{tg} \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$\operatorname{tg} \alpha = \frac{1}{\operatorname{ctg} \alpha}$$

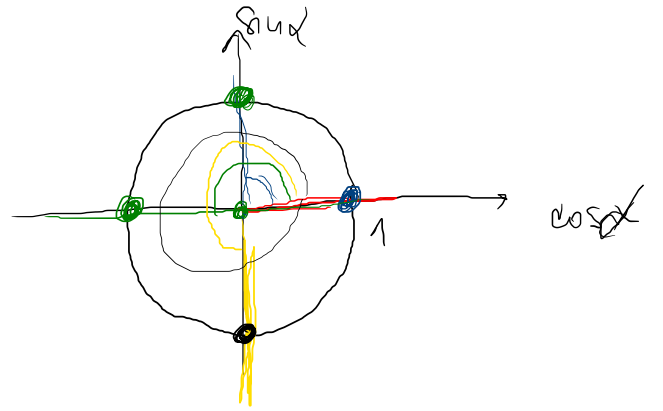
$$\operatorname{ctg} \alpha = \frac{\cos \alpha}{\sin \alpha}$$

$$-1 \leq \sin \alpha \leq 1$$

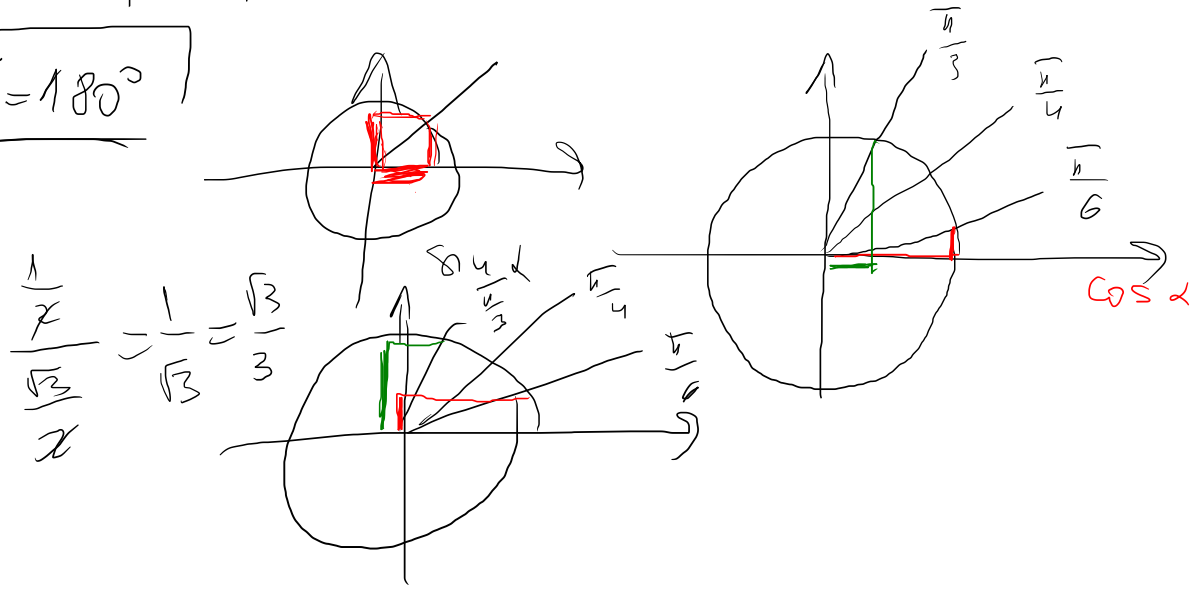
$$-1 \leq \cos \alpha \leq 1$$



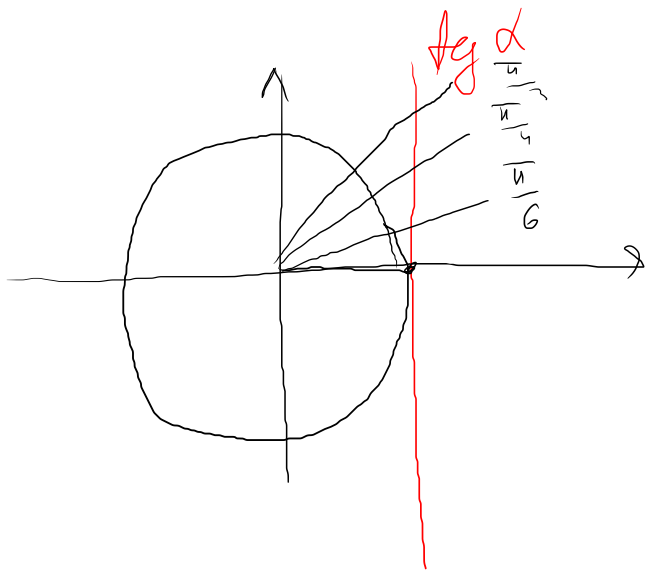
α	0	30°	45°	60°	90°	180°	270°	360°
$\sin \alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
$\cos \alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1
$\tan \alpha$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞	0	$-\infty$	0
$\cot \alpha$	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	$-\infty$	0	∞



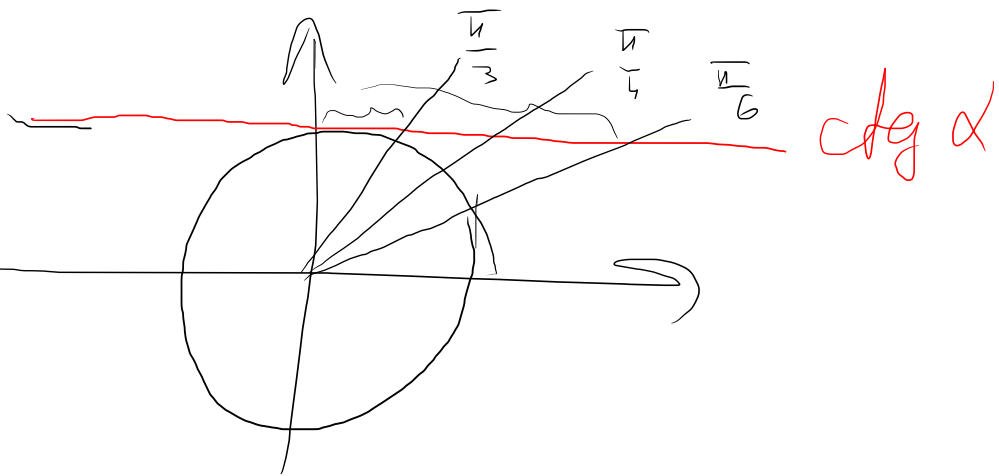
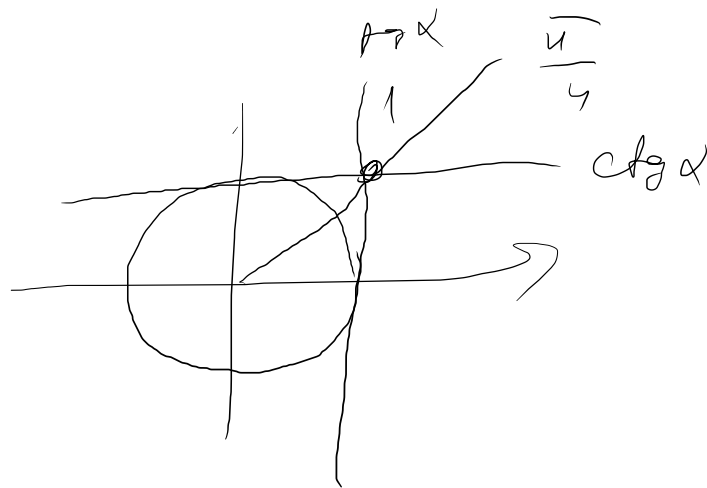
$\alpha = 180^\circ$



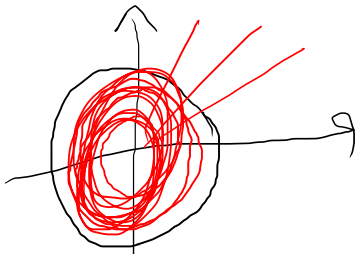
$\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{3}$
 $\frac{1}{2}$, $\frac{\sqrt{2}}{2}$, $\frac{\sqrt{3}}{2}$



$$\sqrt{2} \quad | \quad | \quad \sqrt{2}$$



$$\cos \alpha$$

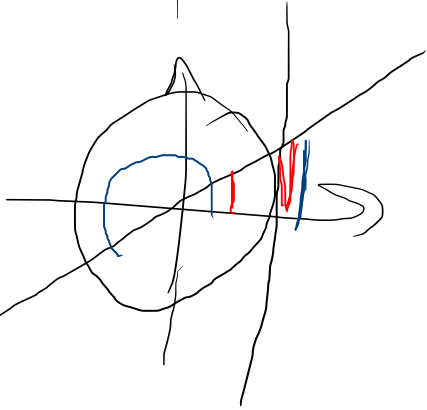


$$\sin(\alpha + 2k\pi) = \sin \alpha$$
$$\cos(\alpha + 2k\pi) = \cos \alpha$$

$$k \in \mathbb{Z}$$

$$\sin(\alpha + \pi) = -\sin \alpha$$

$$\cos(\alpha + \pi) = -\cos \alpha$$

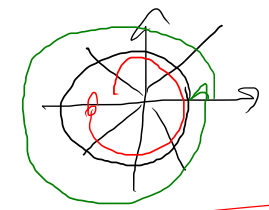
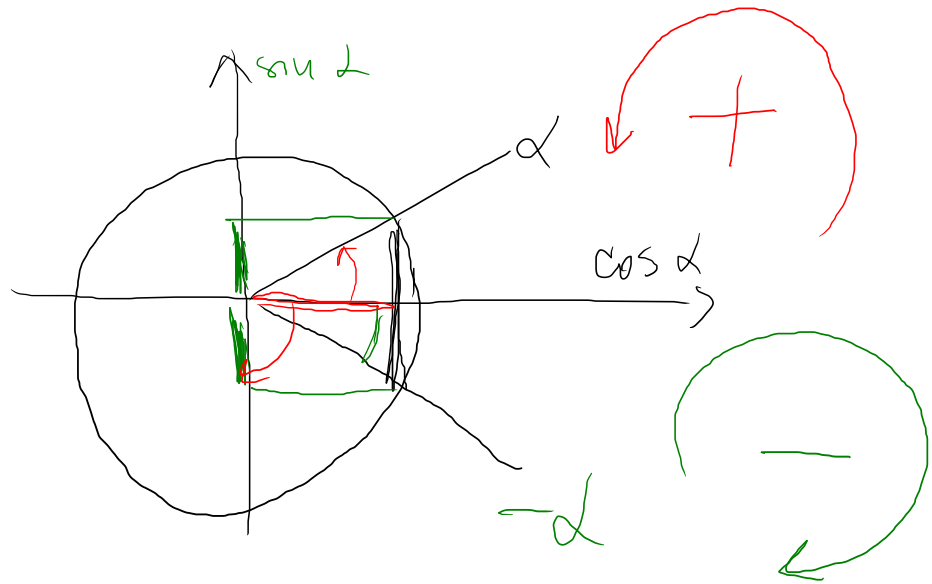


$$\sin(-\alpha) = -\sin \alpha$$

↪ НЕПАРНА

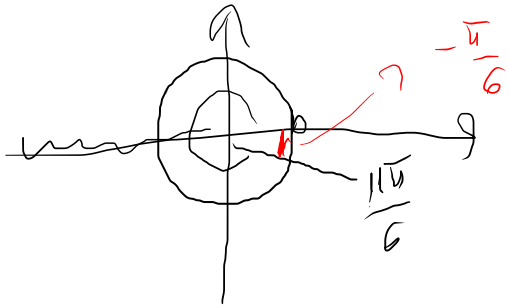
$$\underline{\cos(-\alpha)} = \underline{\cos \alpha}$$

↪ ПАРНА

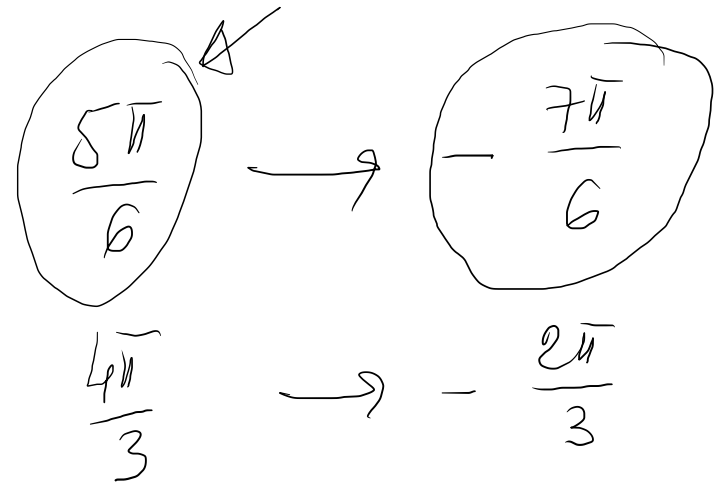


$$\alpha \in (-\pi, \pi]$$

$$\cos\left(\frac{11\pi}{6}\right) = \cos\left(-\frac{\pi}{6}\right) = \cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$$



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



$$2\pi = \frac{12\pi}{6}$$

$$2\pi = \frac{6\pi}{3}$$

$$\frac{7\pi}{6} \rightarrow -\frac{5\pi}{6}$$

$$-\frac{4\pi}{3} \rightarrow \frac{2\pi}{3}$$

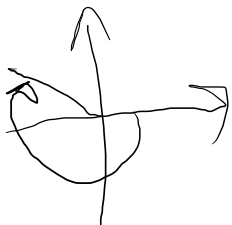
$$2\pi = \frac{12\pi}{6}$$

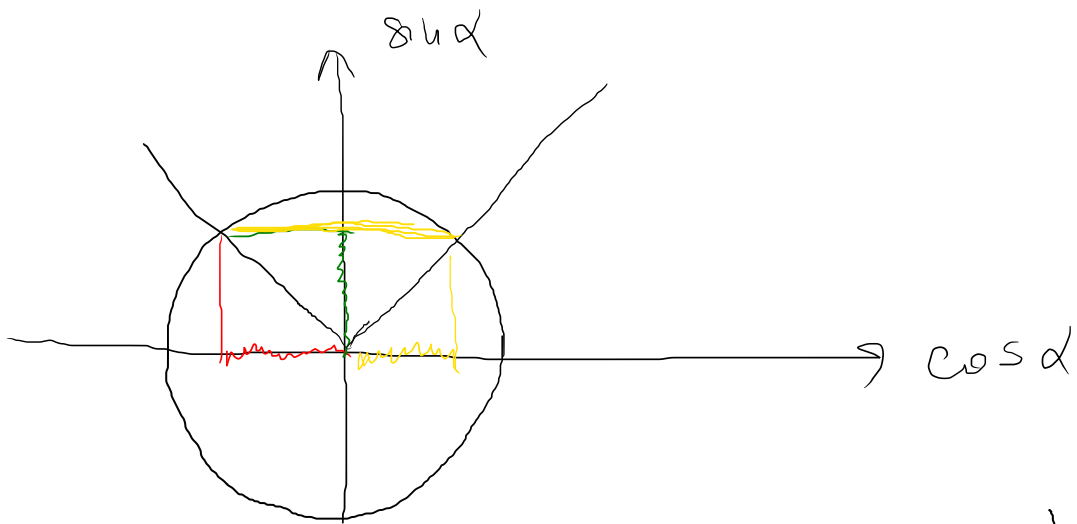


$$\frac{9\pi}{8} \rightarrow$$

$$-\frac{7\pi}{8}$$

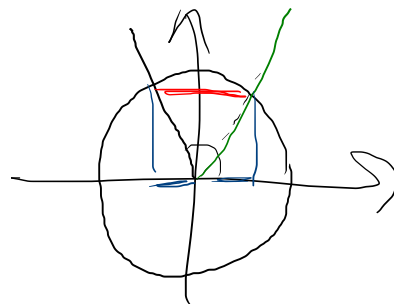
$$2\pi = \frac{16\pi}{8}$$



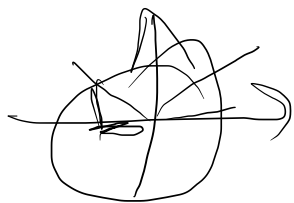


$$\sin \frac{2\pi}{3} = \sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos \frac{2\pi}{3} = -\cos \frac{\pi}{3} = -\frac{1}{2}$$

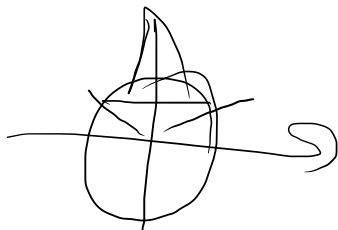


$$\cos \left(\frac{7\pi}{6} \right) = \cos \left(-\frac{5\pi}{6} \right) = \cos \frac{5\pi}{6} = -\cos \frac{\pi}{6} = -\frac{\sqrt{3}}{2}$$



$$\sin \frac{11\pi}{6} = \sin \left(-\frac{\pi}{6} \right) = -\sin \frac{\pi}{6} = -\frac{1}{2}$$

$$\sin \frac{4\pi}{3} = \sin \left(-\frac{2\pi}{3} \right) = -\sin \frac{2\pi}{3} = -\sin \frac{\pi}{3} = -\frac{\sqrt{3}}{2}$$



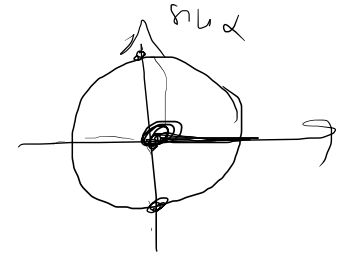
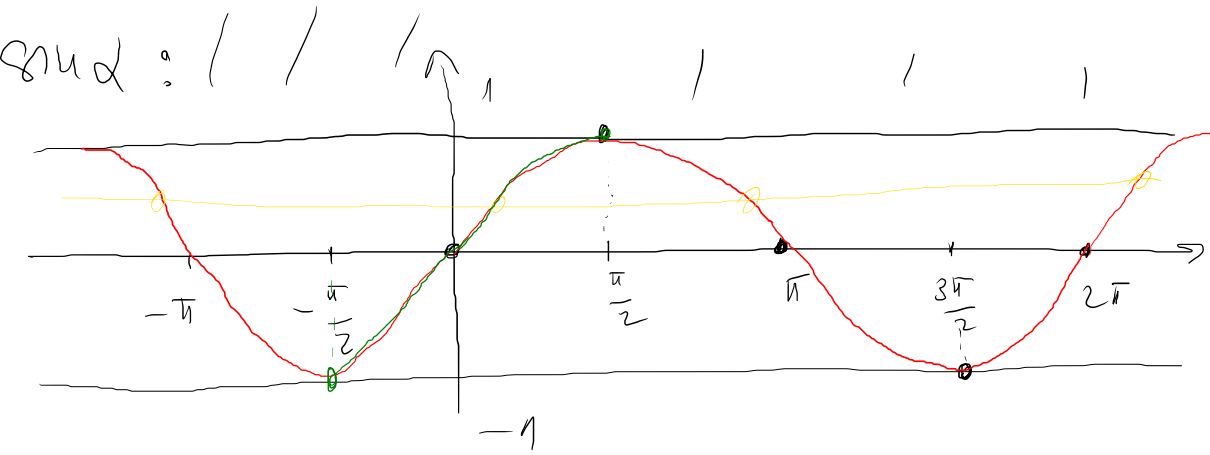
$$\rightarrow \sin 2\alpha = 2 \sin \alpha \cos \alpha$$

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

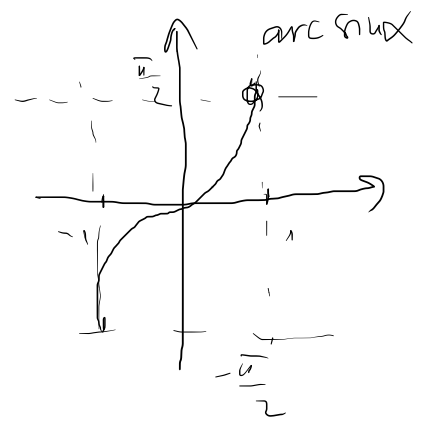
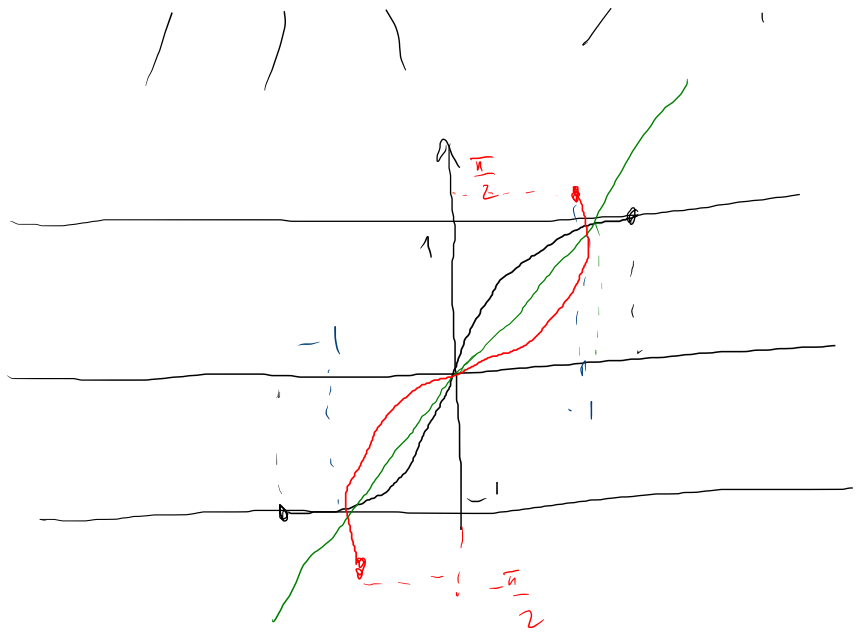
$$\rightarrow \sin^2 \frac{\alpha}{2} = \frac{1 - \cos \alpha}{2}$$

$$\rightarrow \cos^2 \frac{\alpha}{2} = \frac{1 + \cos \alpha}{2}$$





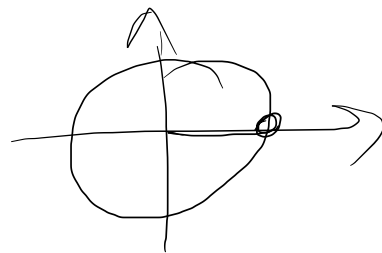
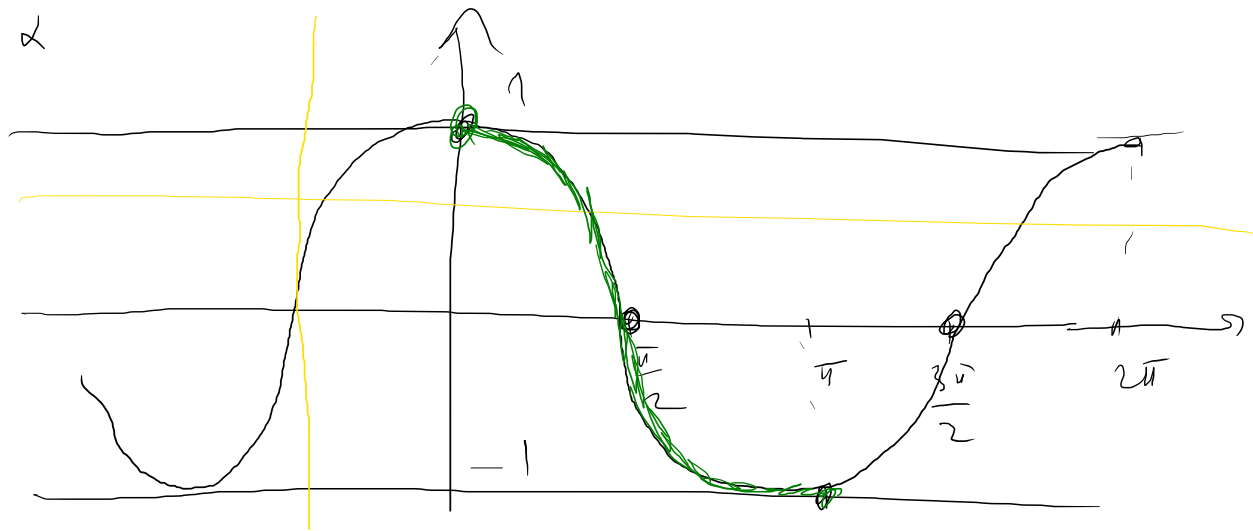
$\sin: \mathbb{R} \rightarrow [-1, 1]$



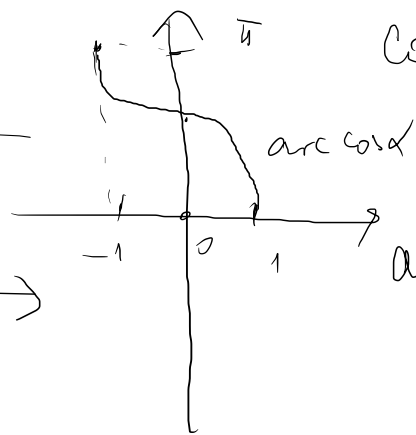
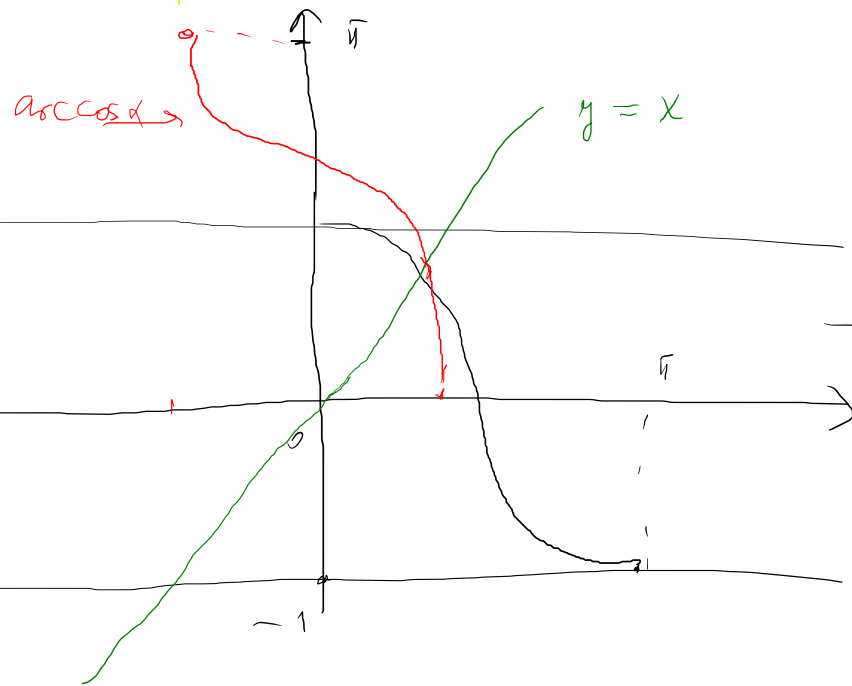
$\sin: \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \rightarrow [-1, 1]$

$\text{arcsin}: [-1, 1] \rightarrow \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

$\cos x$

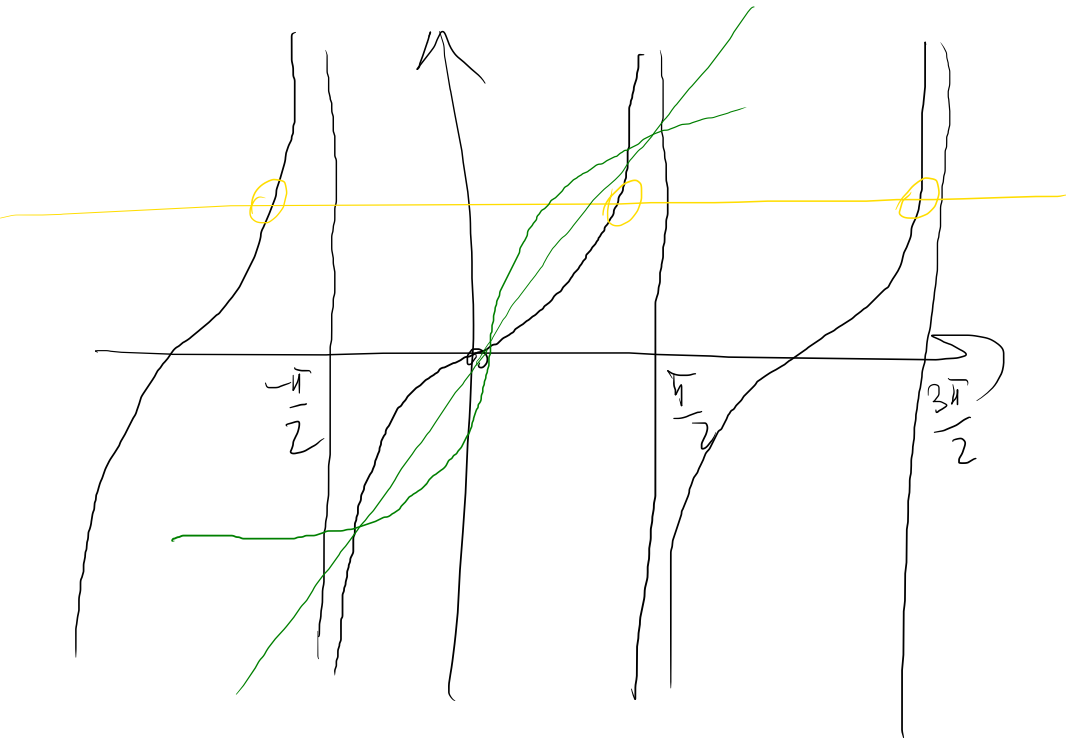


$$\cos: \mathbb{R} \rightarrow [-1, 1]$$



$$\cos: [0, \pi] \rightarrow [-1, 1]$$

$$\arccos: [-1, 1] \rightarrow [0, \pi]$$



$$\tan: \mathbb{R} \setminus \left\{ \frac{\pi}{2} + k\pi \right\} \rightarrow \mathbb{R}$$

$$\tan: \left[-\frac{\pi}{2}, \frac{\pi}{2} \right] \rightarrow \mathbb{R}$$

$$\arctan: \mathbb{R} \rightarrow \left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$$

