

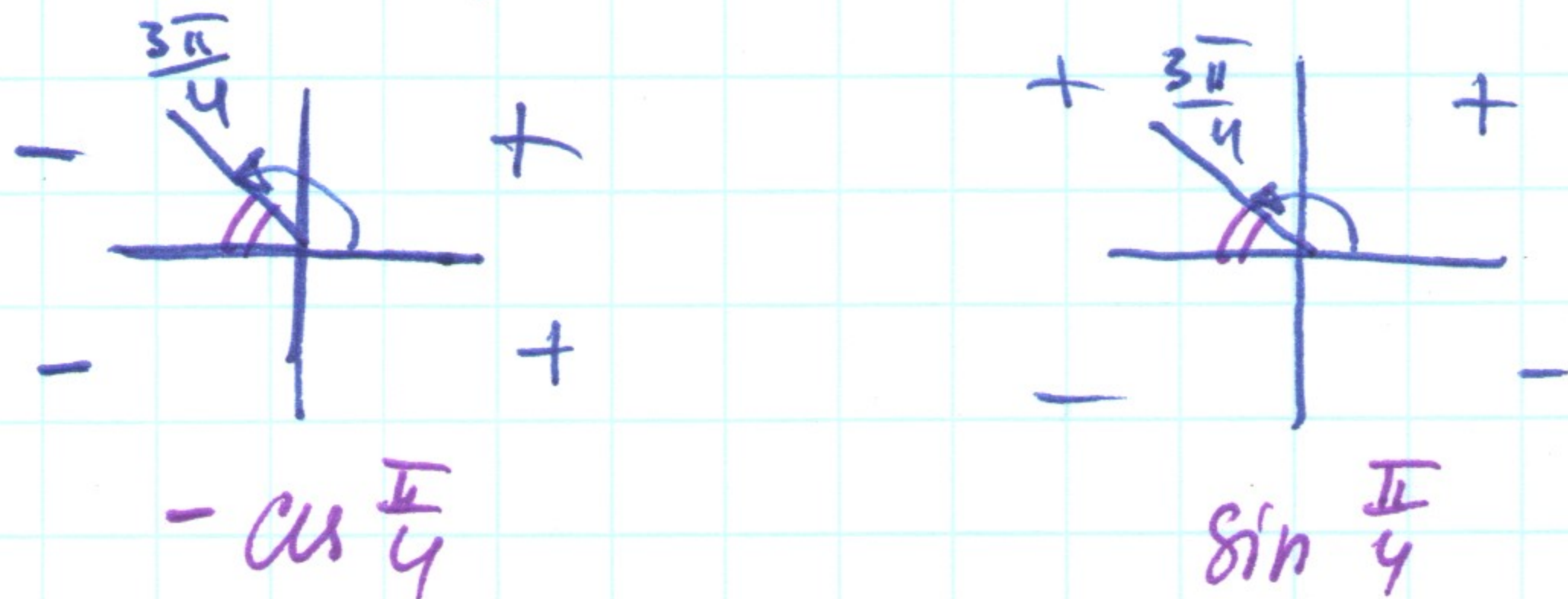
#1

$$\cos(45^\circ - 30^\circ) = \cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ =$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{6} + \sqrt{2}}{4}$$

#3

$$\cos\left(\frac{3\pi}{4} - \frac{\pi}{6}\right) = \cos \frac{3\pi}{4} \cos \frac{\pi}{6} + \sin \frac{3\pi}{4} \sin \frac{\pi}{6} =$$



$$= -\cos \frac{\pi}{4} \cos \frac{\pi}{6} + \sin \frac{\pi}{4} \sin \frac{\pi}{6} = -\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} = \frac{\sqrt{2} - \sqrt{6}}{4}$$

$$- \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} \quad \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$$

#7

$$\cos \frac{5\pi}{12} \cos \frac{\pi}{12} + \sin \frac{5\pi}{12} \sin \frac{\pi}{12} = \cos\left(\frac{5\pi}{12} - \frac{\pi}{12}\right) =$$

$75^\circ \quad 15^\circ \quad 75^\circ \quad 15^\circ$

$$= \cos\left(\frac{4\pi}{12}\right) = \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$$

$$\alpha = \frac{5\pi}{12}$$

$$\beta = \frac{\pi}{12}$$

~~#11~~

$$\textcircled{\#11} \quad \cos\left(x - \frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} (\cos x + \sin x)$$

$$\begin{aligned} \cos\left(x - \frac{\pi}{4}\right) &= \cos x \cos \frac{\pi}{4} + \sin x \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2} \cos x + \frac{\sqrt{2}}{2} \sin x = \\ &= \frac{\sqrt{2}}{2} (\cos x + \sin x) \quad \checkmark \end{aligned}$$

$$\textcircled{\#15} \quad \sin 105^\circ = \sin(60^\circ + 45^\circ) = \sin 60^\circ \cos 45^\circ + \sin 45^\circ \cos 60^\circ =$$

$$105^\circ = 60 + 45$$

$$= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} = \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\textcircled{\#21} \quad \tan\left(\frac{\pi}{6} + \frac{\pi}{4}\right) = \frac{\tan \frac{\pi}{6} + \tan \frac{\pi}{4}}{1 - \tan \frac{\pi}{6} \tan \frac{\pi}{4}} =$$

$$= \frac{\frac{\sqrt{3}}{3} + 1}{1 - \frac{\sqrt{3}}{3} \cdot 1} = \frac{1 + \frac{\sqrt{3}}{3}}{1 - \frac{\sqrt{3}}{3}} = \frac{\left(1 + \frac{\sqrt{3}}{3}\right)^2}{1 - \frac{3}{9}} =$$

$$= \frac{1 + \frac{3}{9} + 2 \frac{\sqrt{3}}{3}}{1 - \frac{1}{3}} = \frac{1 + \frac{1}{3} + 2 \frac{\sqrt{3}}{3}}{\frac{3-1}{3}} = \frac{3+1+2\sqrt{3}}{2} = \frac{4+2\sqrt{3}}{2} =$$

$$= 2 + \sqrt{3}$$

#25

$$\sin 25^\circ \cos 5^\circ + \cos 25^\circ \sin 5^\circ =$$

$$= \sin (25^\circ + 5^\circ) = \sin (30^\circ) = \frac{1}{2}$$

$$\alpha = 25^\circ$$

$$\beta = 5^\circ$$

#31

$$\frac{\tan \frac{\pi}{5} - \tan \frac{\pi}{30}}{1 + \tan \frac{\pi}{5} \tan \frac{\pi}{30}} = \tan \left(\frac{\pi}{5} - \frac{\pi}{30} \right) = \tan \left(\frac{5\pi}{30} \right) =$$

$$= \tan \left(\frac{\pi}{6} \right) = \frac{\sqrt{3}}{3}$$

#33

$$\sin \left(x + \frac{\pi}{2} \right) = \cos x \quad \text{verify.}$$

$$\sin \left(x + \frac{\pi}{2} \right) = \sin x \cos \frac{\pi}{2} + \sin \frac{\pi}{2} \cos x = \sin x \cdot 0 + 1 \cdot \cos x =$$

$$= \cos x \quad \checkmark$$

#35

$$\cos \left(x - \frac{\pi}{2} \right) = \sin x$$

$$\cos \left(x - \frac{\pi}{2} \right) = \cos x \cos \frac{\pi}{2} + \sin x \sin \frac{\pi}{2} = \cos x \cdot 0 + \sin x \cdot 1 = \sin x \quad \checkmark$$

#37

$$\tan (2\pi - x) = -\tan x$$

$$\tan (2\pi - x) = \frac{\tan 2\pi - \tan x}{1 - \tan 2\pi \tan x} = \frac{0 - \tan x}{1 - 0 \cdot \tan x} = \frac{-\tan x}{1} = -\tan x \quad \checkmark$$