(2) $\cos\alpha = \cos\beta$

$\cos\alpha - \cos\beta = 0$

$-2\sin\left(\frac{\alpha+\beta}{2}\right)\sin\left(\frac{\alpha-\beta}{2}\right) = 0$

(1) $\sin\left(\frac{\alpha+\beta}{2}\right) = 0$

$\frac{\alpha+\beta}{2} = p\pi$

$p \in I$

(2) $\sin\left(\frac{\alpha-\beta}{2}\right) = 0$

$\frac{\alpha-\beta}{2} = q\pi$

$\alpha = 2q\pi + \beta$

$\beta \in I$

(1) $\alpha = 2p\pi - \beta$ (2) $\alpha = 2q\pi + \beta$

$$\alpha = 2n\pi \pm \beta$$

$\beta \in [0, \pi]$

$\cos\beta \geq 0$ $\beta \in [0, \pi/2]$ θ

$\cos\beta < 0$ $\beta \in (\pi/2, \pi]$

$\pi - \theta$

Q1

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

$x = \frac{\pi}{3}$

$x = 2n\pi \pm \frac{\pi}{3}$

$n \in I$

Q2 $\cos x = -\frac{\sqrt{3}}{2}$

If $\cos x = \frac{\sqrt{3}}{2}$

$\frac{\pi}{6}$

$\pi - \frac{\pi}{6} = \frac{5\pi}{6}$

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

$n \in I$

(3) $\tan\alpha = \tan\beta$

$$\frac{\sin\alpha}{\cos\alpha} = \frac{\sin\beta}{\cos\beta}$$

$$\sin\alpha\cos\beta = \cos\alpha\sin\beta$$

$$\sin\alpha\cos\beta - \cos\alpha\sin\beta = 0$$

$$\sin(\alpha-\beta) = 0$$

$$\alpha - \beta = n\pi$$

$$\boxed{\alpha = n\pi + \beta}$$

$\beta \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

$n \in I$

Q1 $\tan x = 1$

$x = \pi/4$

$x = n\pi + \frac{\pi}{4}$

(n(-I

(II)

Q2 $\tan x = -\sqrt{3}$

$x = -\frac{\pi}{3} \,/\, \frac{2\pi}{3}$

$x = n\pi + (-\pi/3)$

$x = n\pi - \frac{\pi}{3}$ ✓

$x = n\pi + \frac{2\pi}{3}$ ✓

N·C·ERT

Q3 $\tan x = -\frac{1}{3}$

If $\tan x = \frac{1}{3}$

$x = \tan^{-1}\frac{1}{3}$

$\theta = -\tan^{-1}\frac{1}{3}$

$x = n\pi - \tan^{-1}\frac{1}{3}$

$n \in I$

2nd

$(\pi - \tan^{-1}\frac{1}{3})$

$x = n\pi + (\pi - \tan^{-1}\frac{1}{3})$ ✓

(4) $\sin^2\alpha = \sin^2\beta$

$\sin^2\alpha - \sin^2\beta = 0$

$\sin(\alpha+\beta)\sin(\alpha-\beta) = 0$

$\sin(\alpha+\beta) = 0$ or $\sin(\alpha-\beta) = 0$

$\alpha+\beta = n\pi$ or $\alpha-\beta = n\pi$

$\alpha = n\pi-\beta$ or $\alpha = n\pi+\beta$

$\boxed{\alpha = n\pi \pm \beta}$ $\quad \beta \in [0, \pi/2]$

Q $\sin^2 x = \frac{1}{4}$

$\sin^2 x = \left(\frac{1}{2}\right)^2 = \sin^2 \frac{\pi}{6}$

$\beta = \frac{\pi}{6}$

$x = n\pi \pm \frac{\pi}{6}$ $n \in I$

Q $\sin^2 x = \frac{3}{4}$

$\sin^2 x = \left(\frac{\sqrt{3}}{2}\right)^2 = \sin^2 \frac{\pi}{3}$

$x = n\pi \pm \frac{\pi}{3}$

$n \in I$

(5) $\cos^2\alpha = \cos^2\beta$

$1 - \sin^2\alpha = 1 - \sin^2\beta$

$\sin^2\alpha = \sin^2\beta$

$\alpha = n\pi \pm \beta$

$\beta \in [0, \pi]_2$

Q $\cos^2 x = \frac{1}{4}$

$\cos^2 x = \left(\frac{1}{2}\right)^2$

$= \cos^2 \frac{\pi}{3}$

$x = n\pi \pm \frac{\pi}{3}$

$n \in I$

Q $\cos^2 x = \frac{1}{2}$

$\cos^2 x = \left(\frac{1}{\sqrt{2}}\right)^2$

$= \cos^2 \frac{\pi}{4}$

$x = n\pi \pm \frac{\pi}{4}$

$n \in I$

(6) $\tan^2\alpha = \tan^2\beta$

$\alpha = n\pi \pm \beta$

$\beta \in [0, \pi/2)$

$$\frac{\sin^2\alpha}{\cos^2\alpha} = \frac{\sin^2\beta}{\cos^2\beta}$$

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

$$\sin^2\alpha\cos^2\beta - \sin^2\beta\cos^2\alpha = 0$$

$$(\sin\alpha\cos\beta + \sin\beta\cos\alpha)(\sin\alpha\cos\beta - \sin\beta\cos\alpha) = 0$$

$$\sin(\alpha+\beta)\sin(\alpha-\beta) = 0$$

Q $\tan^2 x = 1$

$\tan^2 x = \tan^2 \frac{\pi}{4}$

$x = n\pi \pm \frac{\pi}{4}$

$n \in I$

Q $\tan^2 x = 3$

$\tan^2 x = (\sqrt{3})^2$

$= \tan^2 \frac{\pi}{3}$

$x = n\pi \pm \frac{\pi}{3}$

$n \in I$