

$$\textcircled{1} \quad \tan \theta + \sqrt{3} = 0$$

$$\tan \theta = -\sqrt{3}$$

$$\theta = \tan^{-1}(-\sqrt{3})$$

$$\boxed{\theta = 120^\circ, 300^\circ}$$

$$\textcircled{3} \quad 2 \sin(\theta + 47^\circ) = 1$$

$$\sin(\theta + 47^\circ) = \frac{1}{2}$$

$$(\theta + 47^\circ) = \sin^{-1}\left(\frac{1}{2}\right)$$

$$\theta + 47^\circ = 30^\circ, \theta + 47^\circ = 150^\circ$$

$$\theta = -17^\circ \quad \theta = 103^\circ$$

$$\downarrow$$

$$\boxed{\theta = 343^\circ, 103^\circ}$$

$$\textcircled{5} \quad 4 \cos^2 \theta = 1$$

$$\cos^2 \theta = \frac{1}{4}$$

$$\sqrt{\cos^2 \theta} = \pm \sqrt{\frac{1}{4}}$$

$$\cos \theta = \pm \frac{1}{2}$$

$$\boxed{\theta = 60^\circ, 120^\circ, -60^\circ, -120^\circ}$$

$$\textcircled{7} \quad 2 \sin \theta \cos \theta = \sqrt{2} \cos \theta$$

$$2 \sin \theta \cos \theta - \sqrt{2} \cos \theta = 0$$

$$\cos \theta (2 \sin \theta - \sqrt{2}) = 0$$

$$\cos \theta = 0$$

$$\boxed{\theta = 90^\circ + 180^\circ n}$$

$$2 \sin \theta - \sqrt{2} = 0$$

$$\sin \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + 360^\circ n$$

$$\theta = 135^\circ + 360^\circ n$$

$$\textcircled{9} \quad \frac{\tan x - \sqrt{3}}{-\tan x} = \frac{2 \tan x}{-\tan x}$$

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

$$x = \tan^{-1}(-\sqrt{3})$$

$$x = 120^\circ + 180^\circ n$$

or

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

$$\textcircled{11} \quad 2 \sin^2 \theta + \sin \theta = 0$$

$$\sin \theta (2 \sin \theta + 1) = 0$$

$$\sin \theta = 0 \quad 2 \sin \theta + 1 = 0$$

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

$$\boxed{\theta = 0, 180^\circ, -30^\circ, -150^\circ}$$

$$\textcircled{13} \quad 2 \cos^2 x - 5 \cos x + 2 = 0$$

$$(2 \cos x - 1)(\cos x - 2) = 0$$

$$2 \cos x - 1 = 0 \quad \cos x = 2$$

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

$$\boxed{x = \frac{\pi}{3}, \frac{5\pi}{3}}$$

$$\textcircled{15} \quad \sin^2 \theta + 5 \sin \theta + 6 = 0$$

$$(\sin \theta + 3)(\sin \theta + 2) = 0$$

$\boxed{\text{No Solutions}}$

$$\textcircled{17} \quad \tan^2 x - \sec x - 1 = 0$$

$$(\sec^2 x - 1) - \sec x - 1 = 0$$

$$\sec^2 x - \sec x - 2 = 0$$

$$(\sec x - 2)(\sec x + 1) = 0$$

$$\sec x = 2$$

$$\sec x = -1$$

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

$$\cos x = -1$$

$$\boxed{x = -\frac{\pi}{3}, \pi}$$