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$$(51) \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{3\pi}{2}$$

$$(52) 0, \frac{\pi}{4}, \pi, \frac{7\pi}{4}$$

$$(53) 0, \pi$$

$$(54) 0, \frac{\pi}{4}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$(55) \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$(56) \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$(57) \frac{\pi}{3} + 2\pi n, \frac{5\pi}{3} + 2\pi n$$

$$(58) \frac{4\pi}{3} + 2\pi n, \frac{3\pi}{2} + 2\pi n, \frac{5\pi}{3} + 2\pi n$$

$$(59) \pi n$$

$$(60) \frac{\pi}{6} + 2\pi n, \frac{5\pi}{6} + 2\pi n$$

$$(61) \pi n$$

$$(62) \frac{\pi}{6} + 2\pi n, \frac{5\pi}{6} + 2\pi n$$

SOLUTIONS

$$(51) 2\cos x \sin x - \cos x = 0$$

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

$$\cos x = 0$$

$$x = \cos^{-1} 0$$

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

$$2\sin x - 1 = 0$$

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

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

$$x = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$(52) \sqrt{2} \tan x \cos x - \tan x = 0$$

$$\tan x (\sqrt{2} \cos x - 1) = 0$$

$$\tan x = 0$$

$$x = \tan^{-1} 0$$

$$x = 0, \pi$$

$$\sqrt{2} \cos x - 1 = 0$$

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

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

$$x = \frac{\pi}{4}, \frac{7\pi}{4}$$

$$(53) \tan x \sin^2 x = \tan x$$

$$\tan x \sin^2 x - \tan x = 0$$

$$\tan x (\sin^2 x - 1) = 0$$

$$\tan x = 0$$

$$x = \tan^{-1}(0)$$

$$x = 0, \pi$$

$$\sin^2 x - 1 = 0$$

$$\sin^2 x = 1$$

$$\sin x = 1$$

$$x = \sin^{-1}(1)$$

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

$$(54) \sin x \tan^2 x = \sin x$$

$$\sin x \tan^2 x - \sin x = 0$$

$$\sin x (\tan^2 x - 1) = 0$$

$$\sin x = 0$$

$$x = \sin^{-1} 0$$

$$x = 0, \pi$$

$$\tan^2 x = 1$$

$$\tan x = \pm 1$$

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

$$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$(55) \tan^2 x = 3$$

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

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

$$x = \pi, 2\pi, 4\pi, 5\pi$$

$$(56) 2\sin^2 x = 1$$

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

$$\sin x = \pm \frac{\sqrt{2}}{2}$$

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

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

$$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$$

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

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

$$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$(57) \quad 4\cos^2 x - 4\cos x + 1 = 0$$

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

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

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

$$x = \frac{\pi}{3} + 2\pi n, \frac{5\pi}{3} + 2\pi n$$

$$(58) \quad 2\sin^2 x + 3\sin x + 1 = 0$$

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

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

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

$$\frac{5\pi}{3} + 2\pi n$$

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

$$(59) \quad \sin^2 \theta - 2\sin \theta = 0$$

$$\sin \theta (\sin \theta - 2) = 0$$

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

$$\theta = 0, \pi \quad \theta = \emptyset$$

$$0 + 2\pi n \Rightarrow \pi n$$

$$\pi + 2\pi n$$

$$(60) \quad 3\sin t = 2\cos^2 t$$

$$3\sin t - 2\cos^2 t = 0$$

$$3\sin t - 2(1 - \sin^2 t) = 0$$

$$3\sin t - 2 + 2\sin^2 t = 0$$

$$2\sin^2 t + 3\sin t - 2 = 0$$

$$(2\sin t - 1)(\sin t + 2) = 0$$

$$\sin t = \frac{1}{2} \quad \sin t = -2$$

$$t = \frac{\pi}{6} + 2\pi n$$

$$\frac{5\pi}{6} + 2\pi n$$

$$t = \emptyset$$

$$(61) \quad \cos(\sin x) = 1$$

$$\cos^{-1}[\cos(\sin x)] = \cos^{-1} 1$$

$$\sin x = 0$$

$$x = 0 + 2\pi n, \pi + 2\pi n \Rightarrow \pi n$$

$$(62) \quad 2\sin^2 x + 3\sin x = 2$$

$$2\sin^2 x + 3\sin x - 2 = 0$$

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

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

$$x = \frac{\pi}{6}, \frac{5\pi}{6}, \emptyset$$

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

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