

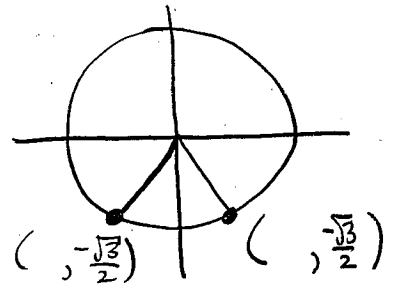
(1) [7 points] Determine all solutions to

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

where $0 \leq \theta < 4\pi$.

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

$$\therefore \theta = \frac{8\pi}{3}, \quad \theta = \frac{10\pi}{3}$$



(2) [8 points] Determine all solutions to

$$\cos(2\theta) + 6\sin^2\theta = 4$$

where $0 \leq \theta < 2\pi$.

$$1 - 2\sin^2\theta + 6\sin^2\theta = 4$$

$$\therefore 4\sin^2\theta = 3$$

$$\sin^2\theta = \frac{3}{4}$$

$$\sin\theta = \pm \frac{\sqrt{3}}{2}$$

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