1.) $4\cos^2\theta - \cancel{3} = 0$

$\quad\quad\quad\quad\ \cancel{+}3 \quad +3$

$$\frac{\cancel{4}\cos^2\theta}{\cancel{4}} = \frac{3}{4}$$

$$\sqrt{\cos^2\theta} = \sqrt{\frac{3}{4}}$$

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

$$\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

2.) $\cos 2\theta = \frac{1}{2}$

QI: $\frac{1}{2}\cdot 2\theta = \frac{1}{2}\cdot\frac{\pi}{3} + \frac{1}{2}\cdot 2\pi k \rightarrow \theta = \frac{\pi}{6} + \pi k$

QIV: $\frac{1}{2}\cdot 2\theta = \frac{1}{2}\cdot\frac{5\pi}{3} + \frac{1}{2}\cdot 2\pi k \rightarrow \theta = \frac{5\pi}{6} + \pi k$

$k=0 \qquad k=1$

$$\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

3.) $$\frac{\cancel{\sqrt{2}}\sin 2\theta}{\cancel{\sqrt{2}}} = \frac{1}{\sqrt{2}}$$

$$\sin 2\theta = \frac{1\cdot\sqrt{2}}{\sqrt{2}\cdot\sqrt{2}}$$

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

QI: $\frac{1}{2}\cdot 2\theta = \frac{1}{2}\cdot\frac{\pi}{4} + \frac{1}{2}\cdot 2\pi k \rightarrow \theta = \frac{\pi}{8} + \pi k$

QII: $\frac{1}{2}\cdot 2\theta = \frac{1}{2}\cdot\frac{3\pi}{4} + \frac{1}{2}\cdot 2\pi k \rightarrow \theta = \frac{3\pi}{8} + \pi k$

$k=0 \qquad k=1$

$$\theta = \frac{\pi}{8}, \frac{3\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}$$

4.) $3\cot^2\theta - \cancel{1} = 0$

$\quad\quad\quad\quad\quad\; \cancel{+1} \quad +1$

$\frac{\cancel{3}\cot^2\theta}{\cancel{3}} = \frac{1}{3}$

$\cot^2\theta = \frac{1}{3}$

$\sqrt{\tan^2\theta} = \sqrt{3}$

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

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

5.) $\cos^3\theta = \cos\theta$

$\quad -\cos\theta \quad -\cos\theta$

$\cos^3\theta - \cos\theta = 0$

$\cos\theta(\cos^2\theta - 1) = 0$

$\cos\theta = 0$

$(0, \pm 1)$

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

$\cos^2\theta - 1 = 0$

$\sqrt{\cos^2\theta} = \sqrt{1}$

$\cos\theta = \pm 1$

$(\pm 1, 0)$

$\theta = 0, \pi$

$\theta = \frac{\pi}{2}, \frac{3\pi}{2}, 0, \pi$

6.) $2\sin^2\theta - \sin\theta - 3 = 0$

$(2\sin\theta - 3)(\sin\theta + 1) = 0$

$2\sin\theta - 3 = 0$ $\qquad$ $\sin\theta + 1 = 0$

$2\sin\theta = 3$ $\qquad$ $\sin\theta = -1$ $\qquad$ $\theta = \frac{3\pi}{2}$

$\sin\theta = \frac{3}{2}$ $\qquad$ $(0,-1)$

undefined

7.) $\tan 4\theta = -1$

QII: $\frac{1}{4}\cdot 4\theta = \frac{1}{4}\cdot\frac{3\pi}{4} + \frac{1}{4}\cdot\pi K \rightarrow \theta = \frac{3\pi}{16} + \frac{\pi}{4}\cdot K = \frac{3\pi}{16} + \frac{4\pi}{16}\cdot K$

K=0	K=1	K=2	K=3	K=4	K=5	K=6	K=7
$\theta = \frac{3\pi}{16}$,	$\frac{7\pi}{16}$,	$\frac{11\pi}{16}$,	$\frac{15\pi}{16}$,	$\frac{19\pi}{16}$,	$\frac{23\pi}{16}$,	$\frac{27\pi}{16}$,	$\frac{31\pi}{16}$

8.) $\cos\frac{\theta}{2} = \frac{1}{2}$

QI: $2 \cdot \frac{\theta}{2} = 2 \cdot \frac{\pi}{3} + 2 \cdot 2\pi k \rightarrow \theta = \frac{2\pi}{3} + 4\pi k$

$K = 0$

$\theta = \frac{2\pi}{3}$

QIV: $2 \cdot \frac{\theta}{2} = 2 \cdot \frac{5\pi}{3} + 2 \cdot 2\pi k \rightarrow \theta = \frac{10\pi}{3} + 4\pi k$

9.) $\cos^2\theta = 1 - \sin\theta$

$\cancel{1} - \cancel{\sin^2\theta} = \cancel{1} - \sin\theta$

$\cancel{-1} + \cancel{\sin^2\theta} \quad \cancel{-1} \quad + \sin^2\theta$

$0 = \sin^2\theta - \sin\theta$

$0 = \sin\theta(\sin\theta - 1)$

$\sin\theta = 0 \qquad \sin\theta - 1 = 0$

$(\pm 1, 0) \qquad \sin\theta = 1$

$(0, 1)$

$\theta = 0, \pi, \pi/2$

$\cancel{\sin^2\theta} + \cos^2\theta = 1$

$\cancel{-\sin^2\theta} \qquad -\sin^2\theta$

$\cos^2\theta = 1 - \sin^2\theta$