11. $4\sin\theta\cos\theta = \sqrt{3}$ $[0, 2\pi]$

$$\frac{2(2\sin\theta\cos\theta)}{2} = \frac{\sqrt{3}}{2}$$

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

$$\sin^{-1} \quad \sin 2\theta = \sin^{-1}\frac{\sqrt{3}}{2}$$

make 2 trips!

$$\frac{1}{2}\cdot 2\theta = \left(\frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}\right)\frac{1}{2}$$

$$\boxed{\frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}}$$

12. $\frac{\sin(90° - \theta)}{\sin\theta} = -\sqrt{3}$ $[-180°, 270°]$

$$\frac{\cos\theta}{\sin\theta} = -\sqrt{3}$$

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

$$\boxed{-30°, 150°}$$

13. $\sin 2\theta \cos 64° + \cos 2\theta \sin 64° = \frac{\sqrt{3}}{2}$ $[0°, 180°]$

$$\sin(2\theta + 64°) = \frac{\sqrt{3}}{2}$$

$$2\theta + 64° = 60°, 120°, 420°, 480°$$

$$2\theta + 64° = 60°, 120°, 420°, 480°$$

$$\frac{60 - 64}{2} = \frac{-4}{2}, \quad \frac{120 - 64}{2} = \frac{56°}{2}, \quad \frac{420 - 64}{2} = \frac{356°}{2}, \quad \frac{480 - 64}{2} = \frac{416}{2}$$

$$\boxed{28°, 178°, ~~208°~~}$$

748°

2^{nd} Day

4. $5\sec^2\theta + 2\tan\theta - 8 = 0$ $\quad [-270°, 180°]$

$5(\tan^2 + 1) + 2\tan\theta - 8 = 0$

$5\tan^2 + 5 + 2\tan\theta - 8 = 0$

$5\tan^2 + 2\tan\theta - 3 = 0$

$(5\tan\theta - 3)(\tan\theta + 1)$

$5\tan\theta - 3 = 0$ $\quad \tan\theta = -1$

$\tan\theta = \frac{3}{5}$ $\quad \boxed{-225°, -45°, 135°}$

$\boxed{-149°, 31°}$

5. $\sin^2\theta + \sin\theta - 1 = 0$ $\quad [-\pi, \pi]$

does not factor ... Oh, no! Quadratic Form.

$a = 1 \quad b = 1 \quad c = -1$

$\frac{-1 \pm \sqrt{1 - 4(1)(-1)}}{2}$

$\sin\theta = \frac{-1 \pm \sqrt{5}}{2}$

$\sin\theta = .618$ $\quad \sin\theta = -1.62$

$\boxed{\theta = .62 \quad 2.52}$ $\quad \varnothing$

6. $\cos 3\theta = \frac{1}{2}$ $\quad [-\frac{\pi}{2}, \frac{\pi}{2}]$

$3\theta = \cos^{-1}\frac{1}{2}$

$\left(-\frac{7\pi}{3}, -\frac{5\pi}{3}, -\frac{\pi}{3}, \frac{\pi}{3}, \frac{5\pi}{3}, \frac{7\pi}{3}\right)\frac{1}{3}$

~~$-\frac{7\pi}{9}$~~, ~~$-\frac{5\pi}{9}$~~, $\boxed{-\frac{\pi}{9}, \frac{\pi}{9}}$, ~~$\frac{5\pi}{9}$~~, ~~$\frac{7\pi}{9}$~~

Solutions to 7-10

(7) $\csc x + \cot x = 1$ $[0, \frac{3\pi}{2}]$

$$\frac{1}{\sin x} + \frac{\cos x}{\sin x} = 1$$

$$\frac{1+\cos x}{\sin x} = 1$$

$$(1+\cos x)^2 = (\sin x)^2$$

$$1 + 2\cos x + \cos^2 x = \sin^2 x$$

$$1 + 2\cos x + \cos^2 x = 1 - \cos^2 x$$

$$2\cos^2 x + 2\cos x = 0$$

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

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

$\cos x = 0$

$\boxed{\frac{\pi}{2}, \frac{3\pi}{2}}$ $\boxed{\pi}$

(8) $2\sin^2 x + 3\sin x + 1 = 0$ $[\frac{-\pi}{2}, \pi]$

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

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

$\boxed{\frac{-\pi}{3}}$ $\boxed{\frac{-\pi}{2}}$

(9) $\frac{\cos x \cdot \cot x}{1 - \sin x} = 3$ $[0, \pi]$

$$\frac{\frac{\cos^2}{\sin}}{1-\sin x} = 3$$

$$\frac{\frac{1-\sin^2}{\sin}}{1-\sin}$$

$$\frac{(1+\sin)(1-\sin)}{\sin} \cdot \frac{1}{1-\sin}$$

$$\frac{1+\sin}{\sin} = 3$$

$$\frac{1}{\sin} + 1 = 3$$

$$\csc + 1 = 3$$

$$\csc x = 2$$

$\boxed{\frac{\pi}{6}, \frac{5\pi}{6}}$

(10) $4\sin^2 x = 2\cos x + 1$ $[0, 2\pi]$

$4(1-\cos^2 x)$

$4 - 4\cos^2 x = 2\cos x + 1$

$0 = 4\cos^2 + 2\cos x - 3$

$0 = (\quad)(\quad)$

It doesn't factor, what to do?

Yes, quad. formula.

$4x^2 + 2x - 3 = 0$

$$\frac{-2 \pm \sqrt{4 - 4(4)(-3)}}{2(4)} = \frac{-2 \pm \sqrt{52}}{8} = \frac{-2 \pm 2\sqrt{13}}{8}$$

$\frac{-1 \pm \sqrt{13}}{4}$ So $\cos x = \frac{-1 \pm \sqrt{13}}{4}$ $\cos x = .651$ $\cos x = -1.151$

1st + 4th → $\boxed{x = .861, 5.421}$ $\emptyset$