Day 4 Notes:

changed!

Solve each trignometric equation. All trig answers are $0 \le \theta \le 2\pi$ and may need a calculator.

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

$\sin\theta = -1/2$

$\theta = 7\pi/6 \quad \theta = 11\pi/6$

Ex: $3\tan^2(\theta)-1=0$

$\tan^2\theta = 1/3$

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

$\theta = \pi/6, 5\pi/6, 7\pi/6, 11\pi/6$

Ex: $\csc^2(\theta)=2$

$\sin^2\theta = 1/2$

$\theta = \pi/4, 3\pi/4, 5\pi/4, 7\pi/4$

Ex: $\sin^2(\theta)\cos(\theta)=4\cos(\theta)$

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

$\cos\theta = 0$

$\pi/2, 3\pi/2$

Ex: $\cos^2(\theta)-4\cos(\theta)+3=0$

$(\cos\theta-3)(\cos\theta-1)=0$

$\cos\theta = 1$

$\theta = 2\pi, 0$

Ex: $1-\cos(\theta)=\sqrt{3}$

$\cos\theta = -\sqrt{3}+1$

$\theta = \arccos(-\sqrt{3}+1)$

Ex: $\sin(\theta)=\sin(-\theta)+1$

$\sin\theta = -\sin\theta + 1$

$2\sin\theta - 1 = 0$

$\theta = \pi/6, 5\pi/6$

Ex: $\tan^2(\theta)=\sin(\theta)\sec(\theta)$

$\tan^2\theta = \tan\theta$

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

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

$\theta = 2\pi, 0 \quad \theta = \pi/4, 5\pi/4$

Ex: $3\cos(\theta)-5=0$

$\cos\theta = 5/3$

$\theta = DNE$

Ex: $\csc^2(\theta)-2\cot(\theta)=0$

$1+\cot^2\theta - 2\cot\theta = 0$

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

$\theta = \pi/4, 5\pi/4$

Ex: $\sec^2(\theta)+\sec(\theta)-2=0$

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

$\sec\theta = -2 \quad \sec\theta = 1$

$\theta = 2\pi/3, 4\pi/3 \quad \theta = 2\pi, 0$

Ex: $\tan(\theta)-\sec(\theta)=\sqrt{3}$

$\tan\theta = \sec\theta + \sqrt{3}$

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

$\sec^2\theta - 1 = \sec^2\theta + 2\sqrt{3}\sec\theta + 3$

$0 = 2\sqrt{3}\sec\theta + 4$

$-2\sqrt{3}/3 = \sec\theta$

$\theta = \cancel{5\pi/6}, 7\pi/6$ extraneous

Ex: $\left(\cot(\theta)-\sqrt{3}\right)^2 = \csc^2(\theta)$

$\cot^2\theta - 2\sqrt{3}\cot\theta + 3 = 1 + \cot^2\theta$

$-2\sqrt{3}\cot\theta + 2 = 0$

$\cot\theta = 1/\sqrt{3}$ or $\sqrt{3}/3$

$\theta = \cancel{\pi/3} \quad \theta = 4\pi/3$ extraneous

Ex: $4\cos^2(\theta)-5\cos(\theta)+1=0$

$(4\cos\theta-1)(\cos\theta-1)$

$\cos\theta = 1/4 \quad \cos\theta = 1$

$\theta = \arccos(1/4) \quad \theta = 2\pi, 0$

$\theta = 2\pi - \arccos(1/4)$

Ex: $\sqrt{2}\csc^2(\theta)+\csc(\theta)=\sqrt{2}$

$(\sqrt{2}\csc\theta-1)(\csc\theta+\sqrt{2})$

$\csc\theta = 1/\sqrt{2} \quad \csc\theta = -\sqrt{2}$

DNE. $\quad \theta = 5\pi/4, 7\pi/4$

Ex: $2\tan^2(\theta)-3\sec(\theta)+3=0$

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

$(2\sec\theta-1)(\sec\theta-1)=0$

$\sec\theta = 1/2 \quad \sec\theta = 1$

DNE $\quad \theta = 2\pi, 0$