6.0 Review of Trigonometry (part 2)

Trigonometric Equations:

Two types of solutions:

Solve the equation $2\cos^2 x - \cos x - 1 = 0$, a) for $0 \le x < 2\pi$ b) general form

Solve the equation $\cos 3x = \frac{\sqrt{2}}{2}$, a) for $0 \le x < 2\pi$ b) general form

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{1}{\tan\theta} = \frac{\cos\theta}{\sin\theta}$$

$$\sec\theta = \frac{1}{\cos\theta} \qquad \csc\theta = \frac{1}{\sin\theta}$$

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

$$\cos\theta = \sin\left(\tfrac{\pi}{2} - \theta\right) \qquad \sin\theta = \cos\left(\tfrac{\pi}{2} - \theta\right)$$

$$\cot\theta = \tan\left(\tfrac{\pi}{2} - \theta\right) \qquad \tan\theta = \cot\left(\tfrac{\pi}{2} - \theta\right)$$

$$\csc\theta = \sec\left(\tfrac{\pi}{2} - \theta\right) \qquad \sec\theta = \csc\left(\tfrac{\pi}{2} - \theta\right)$$

$$\begin{aligned} \sin(\theta + 2\pi) &= \sin\theta \\ \cos(\theta + 2\pi) &= \cos\theta \\ \tan(\theta + \pi) &= \tan\theta \end{aligned}$$

$$\begin{aligned} \sin(-\theta) &= -\sin\theta \\ \cos(-\theta) &= \cos\theta \\ \tan(-\theta) &= -\tan\theta \end{aligned}$$

$$\begin{aligned} \sin(\alpha+\beta) &= \sin\alpha\,\cos\beta + \cos\alpha\,\sin\beta \\ \cos(\alpha+\beta) &= \cos\alpha\,\cos\beta - \sin\alpha\,\sin\beta \\ \sin(\alpha-\beta) &= \sin\alpha\,\cos\beta - \cos\alpha\,\sin\beta \\ \cos(\alpha-\beta) &= \cos\alpha\,\cos\beta + \sin\alpha\,\sin\beta \end{aligned}$$

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\begin{aligned} \cos 2\theta &= \cos^2\theta - \sin^2\theta \\ &= 2\cos^2\theta - 1 \\ &= 1 - 2\sin^2\theta \end{aligned}$$

Prove: $1 + \cos x = \dfrac{\sin^2 x}{1 - \cos x}$ $\qquad$ $\dfrac{\sin 2x}{1 - \cos 2x} = 2\csc 2x - \tan x$