VALUES OF TRIGONOMETRIC RATIOS FOR DIFFERENT ANGLES

	15 º	180	$\left(22\frac{1}{2}\right)^{0}$	36 º
Sin	$\frac{\sqrt{3}-1}{2\sqrt{2}}$	$\frac{\sqrt{5}-1}{4}$	$\frac{1}{2}\sqrt{2-\sqrt{2}}$	$\frac{\sqrt{10-2\sqrt{5}}}{4}$
Cos	$\frac{\sqrt{3}+1}{2\sqrt{2}}$	$\sqrt{\frac{10 + 2\sqrt{5}}{4}}$	$\frac{1}{2}\sqrt{2+2\sqrt{2}}$	$\frac{\sqrt{5}+1}{4}$
tan	2-√3	$\frac{\sqrt{25-10\sqrt{5}}}{5}$	√ 2-1	$\sqrt{5-2\sqrt{5}}$

TRIGONOMETRIC IDENTITIES

$$\cot x - \tan x = 2 \cot 2x$$

$$tan (A+B) = tanA + tanB + tanA \cdot tanB \cdot tan(A+B)$$

If A+B =
$$\frac{\pi}{4}$$
 \Rightarrow tanA + tanB+ tanA · tanB = 1

$$\cos \alpha + \cos \beta + \cos (\alpha + \beta + y) = 4 \cos \left(\frac{\alpha + \beta}{2}\right) \cos \left(\frac{\beta + Y}{2}\right) \cos \left(\frac{Y + \alpha}{2}\right)$$

$$\sin \alpha + \sin \beta + \sin (\alpha + \beta + \gamma) = 4 \sin \left(\frac{\alpha + \beta}{2}\right) \sin \left(\frac{\beta + \gamma}{2}\right) \sin \left(\frac{\gamma + \alpha}{2}\right)$$

$$4 \sin x \sin(60-x) \sin(60+x) = \sin 3x$$

$$4\cos x \cos(60-x)\cos(60+x) = \cos 3x$$

$$\tan x \tan (60-x) \tan (60+x) = \tan 3x$$

SUM OF SINE & COSINE SERIES

$$\sin \frac{\alpha}{\alpha} + \sin(\alpha + \beta) + \sin(\alpha + 2\beta) + ... + \sin(\alpha + (n-1)\beta)$$

$$= \frac{\sin \frac{n\beta}{2}}{\sin \frac{\beta}{2}} \sin \left[\frac{\alpha + (\alpha + (n-1)\beta)}{2}\right]$$

$$\cos \frac{\alpha}{\alpha} + \cos(\alpha + \beta) + \cos(\alpha + 2\beta) + ... + \cos(\alpha + (n-1)\beta)$$

$$= \frac{\sin \frac{n\beta}{2}}{\sin \frac{\beta}{2}} \cos \left[\frac{\alpha + (\alpha + (n-1)\beta)}{2}\right]$$

$$\cos\theta \cdot \cos 2\theta \cdot \cos 2^{2}\theta \dots \cos 2^{n-1}\theta$$

$$= \prod_{r=1}^{n} \cos \left(2^{r-1}\theta\right) = \prod_{r=0}^{n-1} \cos 2^{r}\theta$$

$$= \begin{cases} \frac{\sin 2^{n}\theta}{2^{n} \sin \theta}, \theta \neq k\pi \end{cases}$$

$$1, \theta = 2k\pi$$

$$-1, \theta = (2k+1)\pi$$

CONDITIONAL TRIGONOMETRIC IDENTITIES IN ABC

$$sin2A + sin2B + sin2C = 4sinA sinB sinC$$

$$cos2A + cos2B + cos2C = -1 - 4 cosA cosB cosC$$

$$cos^2A + cos^2B + cos^2C = 1 - 2 cosA cosB cosC$$

$$sin^{2}\left(\frac{A}{2}\right) + sin^{2}\left(\frac{B}{2}\right) + sin^{2}\left(\frac{C}{2}\right) = 1 - 2sin\left(\frac{A}{2}\right)sin\left(\frac{B}{2}\right)sin\left(\frac{C}{2}\right)$$

tanA + tanB + tanC = tanA tanB tanC

$$cotA cotB + cotB cotC + cotC cotA = 1$$

$$\tan \frac{A}{2} \tan \frac{B}{2} + \tan \frac{B}{2} \tan \frac{C}{2} + \tan \frac{C}{2} \tan \frac{A}{2} = 1$$

$$\cot\left(\frac{A}{2}\right) + \cot\left(\frac{B}{2}\right) + \cot\left(\frac{C}{2}\right) = \cot\left(\frac{A}{2}\right) \cot\left(\frac{B}{2}\right) \cot\left(\frac{C}{2}\right)$$

$$sinA + sinB + sinC = 4 cos \left(\frac{A}{2}\right) cos \left(\frac{B}{2}\right) cos \left(\frac{C}{2}\right)$$

$$\cos A + \cos B + \cos C = 1 + 4 \sin \left(\frac{A}{2}\right) \sin \left(\frac{B}{2}\right) \sin \left(\frac{C}{2}\right)$$

$$sin^2A + sin^2B + sin^2C = 2 (1+cosA cosB cosC)$$