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

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

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

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

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

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

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