

- Conditional Identities (when  $A+B+C = \pi$ )

$$1. \sin A + \sin B + \sin C = 4\cos\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}$$

$$2. \cos A + \cos B + \cos C = 1 + 4\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$$

$$3. \sin 2A + \sin 2B + \sin 2C = 4\sin A \sin B \sin C$$

$$4. \cos 2A + \cos 2B + \cos 2C = -1 - 4\cos A \cos B \cos C$$

$$5. \cos 2A + \cos 2B - \cos 2C = 1 - 4\sin A \sin B \cos C$$

$$6. \cos^2 A + \cos^2 B + \cos^2 C = 1 - 2\cos A \cos B \cos C$$

$$7. \sin^2 A + \sin^2 B - \sin^2 C = 2\sin A \sin B \cos C$$

$$8. \sin^2\frac{A}{2} + \sin^2\frac{B}{2} + \sin^2\frac{C}{2} = 1 - 2\sin\frac{A}{2}\sin\frac{B}{2}\cos\frac{C}{2}$$

$$9. \cos^2\frac{A}{2} + \cos^2\frac{B}{2} - \cos^2\frac{C}{2} = 2\cos\frac{A}{2}\cos\frac{B}{2}\sin\frac{C}{2}$$

$$10. \tan A + \tan B + \tan C = \tan A \tan B \tan C$$

$$11. \tan\frac{A}{2}\tan\frac{B}{2} + \tan\frac{B}{2}\tan\frac{C}{2} + \tan\frac{C}{2}\tan\frac{A}{2} = 1$$