

F An Abbreviated Table of Trigonometric Identities

$$1. \sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$$

$$2. \cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$$

$$3. \sin\alpha + \sin\beta = 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

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

$$5. \cos\alpha + \cos\beta = 2 \cos\left(\frac{\alpha + \beta}{2}\right) \cos\left(\frac{\alpha - \beta}{2}\right)$$

$$6. \cos\alpha - \cos\beta = -2 \sin\left(\frac{\alpha + \beta}{2}\right) \sin\left(\frac{\alpha - \beta}{2}\right)$$

$$7. 2 \sin\alpha \sin\beta = \cos(\alpha - \beta) - \cos(\alpha + \beta)$$

$$8. 2 \cos\alpha \cos\beta = \cos(\alpha - \beta) + \cos(\alpha + \beta)$$

$$9. 2 \sin\alpha \cos\beta = \sin(\alpha + \beta) + \sin(\alpha - \beta)$$

$$10. \sin 2\alpha = 2 \sin\alpha \cos\alpha$$

$$11. \cos 2\alpha = 2 \cos^2\alpha - 1 = 1 - 2 \sin^2\alpha$$

$$12. \cos^2\alpha = \frac{1}{2} + \frac{1}{2} \cos 2\alpha$$

$$13. \sin^2\alpha = \frac{1}{2} - \frac{1}{2} \cos 2\alpha$$

$$14. \tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha \tan\beta}$$

$$15. \tan 2\alpha = \frac{2 \tan\alpha}{1 - \tan^2\alpha}$$