

**Addition and Subtraction Identities -a**

$$\sin (A \pm B) = \sin A \cdot \cos B \pm \sin B \cdot \cos A$$

$$\cos (A \pm B) = \cos A \cdot \cos B \pm \sin A \cdot \sin B$$

$$\tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \pm \tan A \cdot \tan B}$$

$$\sin A + \sin B = 2 \sin \frac{1}{2} (A + B) \cdot \sin \frac{1}{2} (A - B)$$

$$\sin A - \sin B = 2 \cos \frac{1}{2} (A + B) \cdot \sin \frac{1}{2} (A - B)$$

$$\cos A + \cos B = 2 \cos \frac{1}{2} (A + B) \cdot \cos \frac{1}{2} (A - B)$$

$$\cos A - \cos B = 2 \sin \frac{1}{2} (A + B) \cdot \sin \frac{1}{2} (A - B)$$

**double-Angle Identities -b**

$$\sin 2A = 2 \sin A \cdot \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A = 1 - 2 \sin^2 A = 2 \cos^2 A - 1$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

**Half-Angle Identities -c**

$$\sin \frac{A}{2} = \sqrt{\frac{1 - \cos A}{2}}$$

$$\cos \frac{A}{2} = \sqrt{\frac{1 + \cos A}{2}}$$

$$\tan \frac{A}{2} = \frac{\sin A}{1 + \cos A}$$