



$$\begin{aligned} \cos(-\alpha) &= \cos\alpha & \tan(-\alpha) &= -\tan\alpha \\ \sin(-\alpha) &= -\sin\alpha & \cot(-\alpha) &= -\cot\alpha \end{aligned}$$

$$\begin{aligned} \sin(\pi - \alpha) &= \sin\alpha & \tan(\pi - \alpha) &= -\tan\alpha \\ \cos(\pi - \alpha) &= -\cos\alpha & \cot(\pi - \alpha) &= -\cot\alpha \end{aligned}$$

$$\begin{aligned} \sin(\alpha + \pi) &= -\sin\alpha & \tan(\alpha + \pi) &= \tan\alpha \\ \cos(\alpha + \pi) &= -\cos\alpha & \cot(\alpha + \pi) &= \cot\alpha \end{aligned}$$

$$\begin{aligned} \sin\left(\frac{\pi}{2} - \alpha\right) &= \cos\alpha & \tan\left(\frac{\pi}{2} - \alpha\right) &= \cot\alpha \\ \cos\left(\frac{\pi}{2} - \alpha\right) &= \sin\alpha & \cot\left(\frac{\pi}{2} - \alpha\right) &= \tan\alpha \end{aligned}$$



$$\begin{aligned} \sin(a+b) &= \sin a \cos b + \sin b \cos a \\ \sin(a-b) &= \sin a \cos b - \sin b \cos a \end{aligned}$$

$$\begin{aligned} \cos(a+b) &= \cos a \cos b - \sin a \sin b \\ \cos(a-b) &= \cos a \cos b + \sin a \sin b \end{aligned}$$

$$\begin{aligned} \cos a + \cos b &= 2 \cos \frac{a+b}{2} \cos \frac{a-b}{2} \\ \sin a + \sin b &= 2 \sin \frac{a+b}{2} \cos \frac{a-b}{2} \end{aligned}$$



$$\begin{aligned} \cos a - \cos b &= -2 \sin \frac{a+b}{2} \sin \frac{a-b}{2} \\ \sin a - \sin b &= 2 \cos \frac{a+b}{2} \sin \frac{a-b}{2} \end{aligned}$$

$$\begin{aligned} \cos a \cdot \cos b &= \frac{1}{2} [\cos(a-b) + \cos(a+b)] \\ \sin a \sin b &= \frac{1}{2} [\cos(a-b) - \cos(a+b)] \end{aligned}$$

$$\begin{aligned} \sin 3a &= 3 \sin a - 4 \sin^3 a \\ \cos 3a &= 4 \cos^3 a - 3 \cos a \end{aligned}$$

$$\begin{aligned} \sin 2a &= 2 \sin a \cos a \\ \cos 2a &= \cos^2 a - \sin^2 a = 1 - 2 \sin^2 a \end{aligned}$$