Table of Identities:

Sum Identities:

$$\begin{aligned}\sin(\alpha+\beta) &= \sin\alpha\cos\beta+\sin\beta\cos\alpha\\ \cos(\alpha+\beta) &= \cos\alpha\cos\beta-\sin\alpha\sin\beta\\ \tan(\alpha+\beta) &= \frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}\end{aligned}$$

Double-Angle Identities & Power-Reducing Identities:

From the Sum Identities you can figure these out easily. Recall that the technique involves taking β to be equal to α.

Half-Angle Identities:

$$\begin{aligned}\sin\frac{\alpha}{2} &= \pm\sqrt{\frac{1-\cos\alpha}{2}}\\ \cos\frac{\alpha}{2} &= \pm\sqrt{\frac{1+\cos\alpha}{2}}\end{aligned}$$

Product-to-Sum Identities:

$$\sin\alpha\cos\beta = \frac{1}{2}\left[\sin(\alpha+\beta)+\sin(\alpha-\beta)\right]$$

$$\cos\alpha\sin\beta = \frac{1}{2}\left[\sin(\alpha+\beta)-\sin(\alpha-\beta)\right]$$

$$\cos\alpha\cos\beta = \frac{1}{2}\left[\cos(\alpha+\beta)+\cos(\alpha-\beta)\right]$$

$$\sin\alpha\sin\beta = \frac{1}{2}\left[\cos(\alpha-\beta)-\cos(\alpha+\beta)\right]$$

Sum-to-Product Identities:

$$\begin{aligned}\sin x+\sin y &= 2\sin\frac{x+y}{2}\cos\frac{x-y}{2}\\ \cos x+\cos y &= 2\cos\frac{x+y}{2}\cos\frac{x-y}{2}\\ \sin x-\sin y &= 2\cos\frac{x+y}{2}\sin\frac{x-y}{2}\\ \cos x-\cos y &= -2\sin\frac{x+y}{2}\sin\frac{x-y}{2}\end{aligned}$$