



## Product-to-Sum Identities

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

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

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

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

## Sum-to-Product Identities

$$\sin A + \sin B = 2 \sin \left( \frac{A + B}{2} \right) \cos \left( \frac{A - B}{2} \right)$$

$$\sin A - \sin B = 2 \sin \left( \frac{A - B}{2} \right) \cos \left( \frac{A + B}{2} \right)$$

$$\cos A + \cos B = 2 \cos \left( \frac{A + B}{2} \right) \cos \left( \frac{A - B}{2} \right)$$

$$\cos A - \cos B = -2 \sin \left( \frac{A + B}{2} \right) \sin \left( \frac{A - B}{2} \right)$$