

# Summary. Families of Trigonometric Identities

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## Sine Family (Mixed Products)

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(2x) = 2 \sin x \cos x$$



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

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

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## Cosine Family (Matching Products)

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\cos(2x) = \cos^2 x - \sin^2 x$$



$$\cos(2x) + 1 = 2 \cos^2 x$$

$$1 - \cos(2x) = 2 \sin^2 x$$

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

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

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

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

$$\pm \sqrt{\frac{1}{2} + \frac{1}{2} \cos(x)} = \cos\left(\frac{x}{2}\right)$$

$$\sqrt{\frac{1}{2} - \frac{1}{2} \cos(x)} = \sin\left(\frac{x}{2}\right)$$