

Test 2 Formulas

Sum and Difference Formulas

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

Double-Angle Formulas

$$\begin{aligned}\sin(2\alpha) &= 2 \sin \alpha \cos \alpha \\ \cos(2\alpha) &= \cos^2 \alpha - \sin^2 \alpha = 1 - 2 \sin^2 \alpha = 2 \cos^2 \alpha - 1 \\ \tan(2\alpha) &= \frac{2 \tan \alpha}{1 - \tan^2 \alpha}\end{aligned}$$

Half-Angle Formulas

$$\sin \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{2}}, \quad \cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}, \quad \tan \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{1 + \cos \alpha}}$$

More Half-Angle Formulas for $\tan \frac{\alpha}{2}$

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

	Inverse Sine Function	Inverse Cosine Function	Inverse Tangent Function
Function	$y = \sin^{-1} x$	$y = \cos^{-1} x$	$y = \tan^{-1} x$
Domain:	$-1 \leq x \leq 1$	$-1 \leq x \leq 1$	$-\infty < x < \infty$
Range:	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$	$0 \leq y \leq \pi$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$