

## הזהיות בטריגונומטריה

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{1}{\cot \alpha}$$

$$\cot \alpha = \frac{\cos \alpha}{\sin \alpha} = \frac{1}{\tan \alpha}$$

$$\tan \alpha \cdot \cot \alpha = 1$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

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

$$1 + \cot^2 \alpha = \frac{1}{\sin^2 \alpha}$$

$$\sec \alpha = \frac{1}{\sin \alpha}$$

$$\operatorname{cosec} \alpha = \frac{1}{\cos \alpha}$$

$$\sin(90^\circ - \alpha) = \cos \alpha$$

$$\cos(90^\circ - \alpha) = \sin \alpha$$

$$\tan(90^\circ - \alpha) = \cot \alpha$$

$$\cot(90^\circ - \alpha) = \tan \alpha$$

$$\sin(-\alpha) = -\sin \alpha$$

$$\cos(-\alpha) = \cos \alpha$$

$$\tan(-\alpha) = -\tan \alpha$$

$$\cot(-\alpha) = -\cot \alpha$$

$$\sin(180^\circ - \alpha) = \sin \alpha$$

$$\cos(180^\circ - \alpha) = -\cos \alpha$$

$$\tan(180^\circ - \alpha) = -\tan \alpha$$

$$\cot(180^\circ - \alpha) = -\cot \alpha$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \sin \beta \cdot \cos \alpha$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \sin \beta \cdot \cos \alpha$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \cdot \tan \beta}$$

$$\tan(\alpha - \beta) = \frac{\tan \alpha - \tan \beta}{1 + \tan \alpha \cdot \tan \beta}$$

$$\cot(\alpha + \beta) = \frac{\cot \alpha \cdot \cot \beta - 1}{\cot \alpha + \cot \beta}$$

$$\cot(\alpha - \beta) = \frac{\cot \alpha \cdot \cot \beta + 1}{\cot \alpha - \cot \beta}$$

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

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

$$\cos \alpha + \cos \beta = 2 \cos \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

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

$$\sin 2\alpha = 2 \sin \alpha \cos \alpha \Rightarrow \sin \alpha = 2 \sin \frac{\alpha}{2} \cos \frac{\alpha}{2}$$

$$\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha = 2 \cos^2 \alpha - 1 = 2 \sin^2 \alpha - 1$$

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

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

$$2 \sin^2 \alpha = 1 - \cos 2\alpha$$

$$2 \cos^2 \frac{\alpha}{2} = 1 + \cos \alpha$$

$$2 \cos^2 \alpha = 1 + \cos 2\alpha$$

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

$$\sin \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{2}}$$

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

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

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

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

	30°	45°	60°
Sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
Cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
Tan	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$
Cot	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$