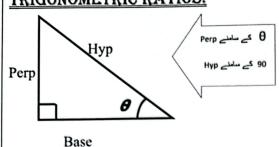
# TRIGNOMETRIC REVIEW

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#### TRIGONOMETRIC RATIOS:



$$sin\theta = \frac{Perp}{Hyp}$$

$$sin\theta = \frac{1}{csc\theta}$$

$$tan\theta = \frac{sin\theta}{cos\theta}$$

$$cos\theta = \frac{Base}{Hyp}$$

$$sin\theta = \frac{Perp}{Hyp}$$
  $sin\theta = \frac{1}{csc\theta}$   $tan\theta = \frac{sin\theta}{cos\theta}$   $cos\theta = \frac{Base}{Hyp}$   $cos\theta = \frac{1}{sec\theta}$   $cot\theta = \frac{cos}{sin\theta}$ 

$$cot\theta = \frac{cos}{sin\theta}$$

$$tan\theta = \frac{Perp}{Base}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

## PYTHAGOREAN THEOREM AND PYTHAGOREAN IDENTITIES:

$$(Base)^2 + (Perp)^2 = (Hyp)^2$$

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

$$1 + tan^2\theta = sec^2\theta$$

$$1+cot^2\theta=csc^2\theta$$

$$\sin(-\theta) = -\sin\theta$$

$$\cos(-\theta) = \cos\theta$$

$$\tan(-\theta) = -\tan\theta$$

$$\csc(-\theta) = -\csc\theta$$

$$sec(-\theta) = sec \theta$$

$$\cot(-\theta) = -\cot\theta$$

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

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

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

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

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

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

$$\sin 2\alpha = 2\sin\alpha \cos\alpha$$

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

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

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

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

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

**SUM TO PRODUCT:** 
$$\sin \alpha + \sin \beta = 2\sin \frac{\alpha + \beta}{2}\cos \frac{\alpha - \beta}{2}$$

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

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

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

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

**PRODUCT TO SUM:** 
$$2\sin\alpha\cos\beta = \sin(\alpha + \beta) + \sin(\alpha - \beta)$$

$$2\cos\alpha\sin\beta = \sin(\alpha + \beta) - \sin(\alpha - \beta)$$

$$2\cos\alpha\cos\beta = \cos(\alpha + \beta) + \cos(\alpha - \beta) \qquad -2\sin\alpha\sin\beta = \cos(\alpha + \beta) - \cos(\alpha - \beta)$$

$$-2\sin\alpha\sin\beta=\cos(\alpha+\beta)-\cos(\alpha-\beta)$$

	90°	π/2	
180° ∏	III	I	$\frac{2\pi}{0^{0}}$ $360^{0}$
	270°	3π/	2

θ degree 🦠	0	30	45	60	90	180	270	360
θ readian	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$\sin  heta$	0	1/2	1/√2	$\sqrt{3}/2$	1	0	-1	0
cos θ	1	$\sqrt{3}/2$	1/√2	1/2	0	-1	0	1
tan 0	0	1/√3	1	√3	∞	0	∞	0

	•		
$\sin \theta$	All +ve		
csc θ II	I		
<b>▼ III</b>	IV		
tan θ	cos θ		
cot θ	sec θ		
+ve	+ve		