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## Trigonometry

$$\sin 2\theta = 2 \sin \theta \cos \theta$$

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

$$\tan 2\theta = \frac{2 - \tan \theta}{1 - \tan^2 \theta}$$

$$sin(x + y) = sin x cos y + cos x sin y$$

$$\sin(x - y) = \sin x \cos y - \cos x \sin y$$

$$tan(x + y) = \frac{tan x + tan y}{1 - tan x.tan y}$$

$$tan(x-y) = \frac{tanx - tany}{1 + tanx.tany}$$

$$cos(x + y) = cos x cos y - sin x sin y$$

$$cos(x - y) = cos x cos y + sin x sin y$$

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

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

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

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

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

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

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

$$\sin \theta \cdot \sin (60 - \theta) \cdot \sin (60 + \theta) = 1/4 \sin 3 \theta$$

$$\cos \theta \cdot \cos (60 - \theta) \cdot \cos (60 + \theta) = 1/4 \cos 3 \theta$$

$$\tan \theta$$
.  $\tan (60 - \theta)$ .  $\tan (60 + \theta) = \tan 3 \theta$ 

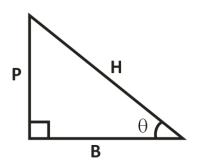
## **Complementry Pairs:**

If 
$$\sin x = \cos y \implies x + y = 90^{\circ}$$

$$tan x = cot y \implies x + y = 90^{\circ}$$

$$cosec x = sec y \implies x + y = 90^{\circ}$$





$$\sin\theta = \frac{P}{H}$$

$$\cos\theta = \frac{B}{H}$$

$$\tan\theta = \frac{P}{B}$$

$$cosec\theta = \frac{H}{P}$$

$$\sec\theta = \frac{H}{B}$$

$$\cot \theta = \frac{B}{P}$$

## **Maxima and Minima**

1.	a sin $\theta$ + b cos $\theta$	$-\sqrt{a^2+b^2}$	$\sqrt{a^2+b^2}$
2.	a sin $\theta$ – b cos $\theta$	$-\sqrt{a^2+b^2}$	$\sqrt{a^2+b^2}$
3.	$a sin^2 \theta + b cos^2 \theta$	smaller between a & b	Bigger between a & b
4.	$a sin^2 \theta + b cosec^2 \theta$	2√ab	×
5.	$a cos^2 \theta + b sec^2 \theta$	2√ab	×
6.	a $tan^2 \theta + b \cot^2 \theta$	2√ab	×
7.	a $\sec^2 \theta + b \csc^2 \theta$	$\left(\sqrt{a} + \sqrt{b}\right)^2$	x