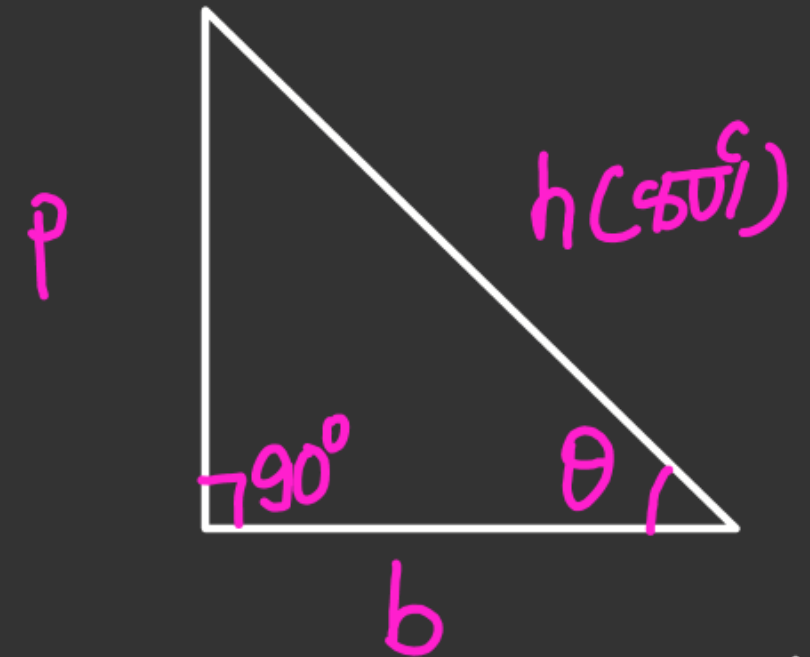
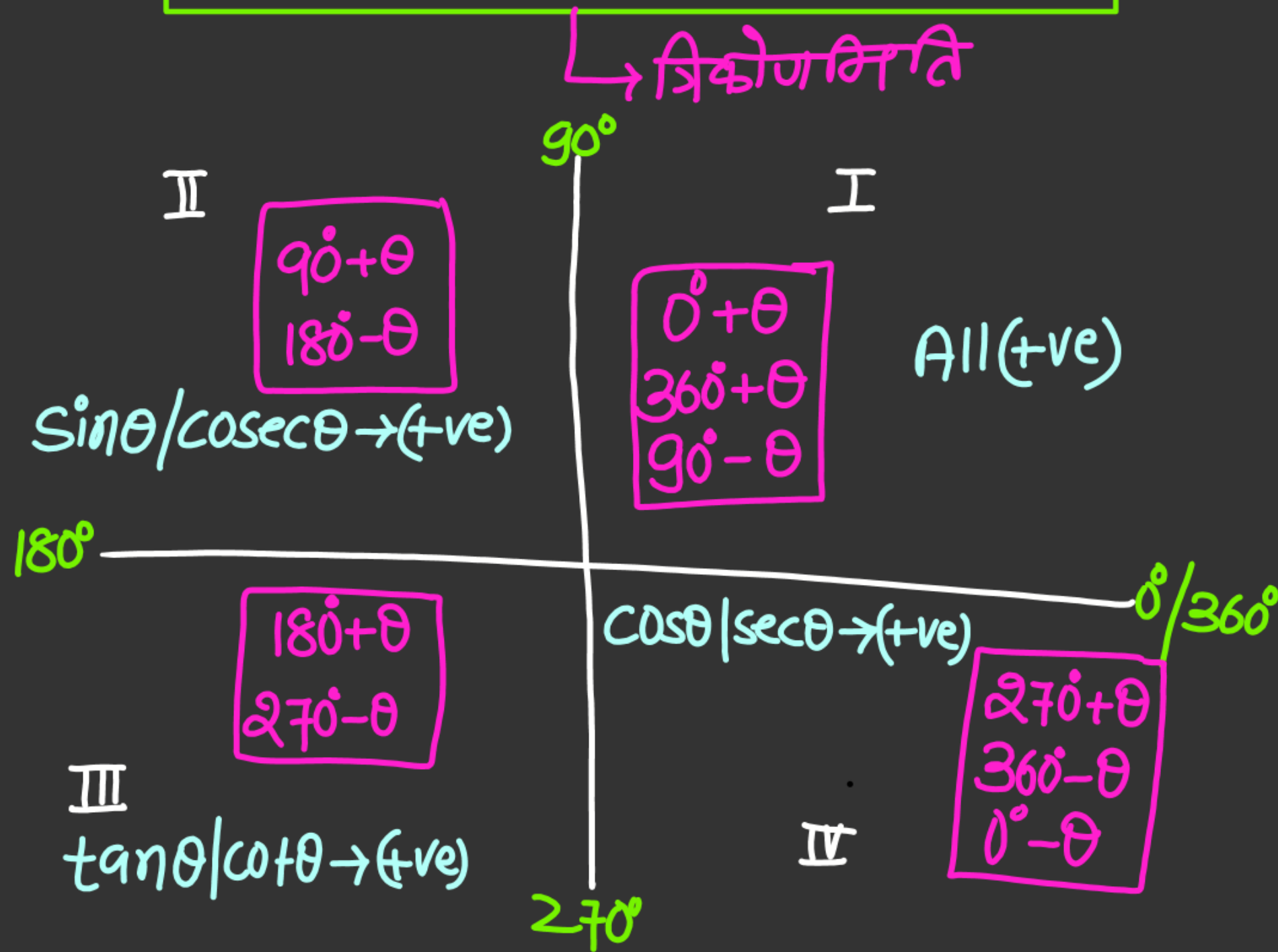


Trigonometry



$$\sin\theta = \frac{p}{h}, \operatorname{cosec}\theta = \frac{h}{p}$$

$$\cos\theta = \frac{b}{h}, \sec\theta = \frac{h}{b}$$

$$\tan\theta = \frac{p}{b}, \cot\theta = \frac{b}{p}$$

① $90^\circ, 270^\circ, 450^\circ, 630^\circ \dots \dots \dots 90$ के विषम गुणज पर मान *change* होता है।
 $90 \times 1 \quad 90 \times 3 \quad 90 \times 5 \quad 90 \times 7$

$$\sin \theta \Rightarrow \cos \theta$$

$$\tan \theta \Rightarrow \cot \theta$$

$$\sec \theta \Rightarrow \csc \theta$$

② $0^\circ, 180^\circ, 360^\circ, 540^\circ, 720^\circ \dots \dots \dots 90$ के सम गुणज पर मान *change* नहीं होता है।
 $90 \times 0 \quad 90 \times 2 \quad 90 \times 4 \quad 90 \times 6 \quad 90 \times 8$

✓ I

$$\sin(90-\theta) = \cos\theta$$

$$\cos(90-\theta) = \sin\theta$$

$$\tan(90-\theta) = \cot\theta$$

$$\cot(90-\theta) = \tan\theta$$

$$\sec(90-\theta) = \operatorname{cosec}\theta$$

$$\operatorname{cosec}(90-\theta) = \sec\theta$$

$$\sin(360+\theta) = \sin\theta$$

$$\cos(360+\theta) = \cos\theta$$

$$\tan(360+\theta) = \tan\theta$$

$$\cot(360+\theta) = \cot\theta$$

$$\sec(360+\theta) = \sec\theta$$

$$\operatorname{cosec}(360+\theta) = \operatorname{cosec}\theta$$

2nd

$$\sin(90+\theta) \rightarrow +\cos\theta$$

$$\cos(90+\theta) \rightarrow -\sin\theta$$

$$\tan(90+\theta) \rightarrow -\cot\theta$$

$$\cot(90+\theta) \rightarrow -\tan\theta$$

$$\sec(90+\theta) \rightarrow -\operatorname{cosec}\theta$$

$$\operatorname{cosec}(90+\theta) \rightarrow +\sec\theta$$

0/180/360 X

$$\sin(180-\theta) \rightarrow +\sin\theta$$

$$\cos(180-\theta) \rightarrow -\cos\theta$$

$$\tan(180-\theta) \rightarrow -\tan\theta$$

$$\cot(180-\theta) \rightarrow -\cot\theta$$

$$\sec(180-\theta) \rightarrow -\sec\theta$$

$$\operatorname{cosec}(180-\theta) \rightarrow +\operatorname{cosec}\theta$$

#

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

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

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

$$\operatorname{cosec}(-\theta) = -\operatorname{cosec}\theta$$

#

$$\textcircled{i} \cos(-\theta) = \cos\theta$$

$$\textcircled{ii} \sec(-\theta) = \sec\theta$$

$$\Rightarrow \sin(-\theta) = \sin^{4^{\text{th}}}(0^\circ - \theta) = -\sin\theta$$

$$\Rightarrow \cos(-\theta) = \cos(0^\circ - \theta) = +\cos\theta$$

$\theta \rightarrow 0^\circ$	30°	45°	60°	90°
$\sin \theta \rightarrow 0$	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta \rightarrow 1$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan \theta \rightarrow 0$	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
$\cot \theta \rightarrow \infty$	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\sec \theta \rightarrow 1$	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
$\csc \theta \rightarrow \infty$	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

$$\textcircled{i} \sin 15^\circ = \cos 75^\circ = \frac{\sqrt{3}-1}{2\sqrt{2}}$$

$$\textcircled{ii} \cos 15^\circ = \sin 75^\circ = \frac{\sqrt{3}+1}{2\sqrt{2}}$$

$$\textcircled{iii} \tan 15^\circ = \cot 75^\circ = \frac{\sqrt{3}-1}{\sqrt{3}+1} = 2-\sqrt{3}$$

$$\textcircled{iv} \cot 15^\circ = \tan 75^\circ = \frac{\sqrt{3}+1}{\sqrt{3}-1} = 2+\sqrt{3}$$

$$\sin 120^\circ =$$

$$\sin 120^\circ \begin{cases} \rightarrow \sin(90+30) \\ \rightarrow \sin(180-60) \end{cases}$$

$$\begin{array}{l} \text{2nd} \\ \sin(90+30) = +\cos 30 \\ = \frac{\sqrt{3}}{2} \end{array}$$

$$\begin{array}{l} \text{2nd} \\ \sin(180-60) = +\sin 60 \\ = \frac{\sqrt{3}}{2} \text{ Ans} \end{array}$$

$$\begin{array}{l} \text{3rd} \\ \# \cos 210^\circ = \cos(180+30) = -\cos 30^\circ \\ = -\frac{\sqrt{3}}{2} \end{array}$$

$$\begin{array}{l} \text{3rd} \\ \# \tan(-210^\circ) = -\tan 210^\circ = -\tan(180+30) \\ = -x + \tan 30 \\ = -\tan 30^\circ \\ = -\frac{1}{\sqrt{3}} \text{ Ans} \end{array}$$

$$\# \cos(-390^\circ)$$

$$\cos(-390^\circ) = \cos 390^\circ = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\# \tan(-480^\circ) = -\tan 480^\circ$$

$$= -\tan 120^\circ$$

$$= -\tan^{2nd}(90+30)$$

$$= -x - \cot 30$$

$$= +\sqrt{3}$$

$$\sqrt{3} \text{ Ans}$$

$$\begin{array}{r} 360) 390 (1 \\ \underline{-360} \\ 30 \text{ (शेष)} \end{array}$$

$$\begin{array}{r} 360) 480 (1 \\ \underline{-360} \\ 120 \text{ (शेष)} \end{array}$$

$$\# \sin(930^\circ) =$$

$$\begin{aligned}
 \sin(930^\circ) &= \sin 210^\circ \\
 &= \sin(180^\circ + 30^\circ) \\
 &= -\sin 30^\circ = -\frac{1}{2}
 \end{aligned}$$

$$\begin{array}{r}
 360) 930 \text{ (2)} \\
 \underline{-720} \\
 210 \text{ (शेष)}
 \end{array}$$

$$\begin{array}{r}
 360) 1230 \text{ (3)} \\
 \underline{1080} \\
 150 \text{ (शेष)}
 \end{array}$$

$$\begin{aligned}
 \# \cos(-1230^\circ) &= \cos 1230^\circ = \cos 150^\circ \\
 &\quad \text{2nd} \\
 \cos 150^\circ &= \cos(90^\circ + 60^\circ) \\
 &= -\sin 60^\circ
 \end{aligned}$$

$$= -\frac{\sqrt{3}}{2}$$

$$\begin{aligned}
 &\boxed{\pi = 180^\circ} \\
 \approx & \text{ (i) } D \times \frac{\pi}{180} = R \\
 \approx & \text{ (ii) } R \times \frac{180}{\pi} = D
 \end{aligned}$$