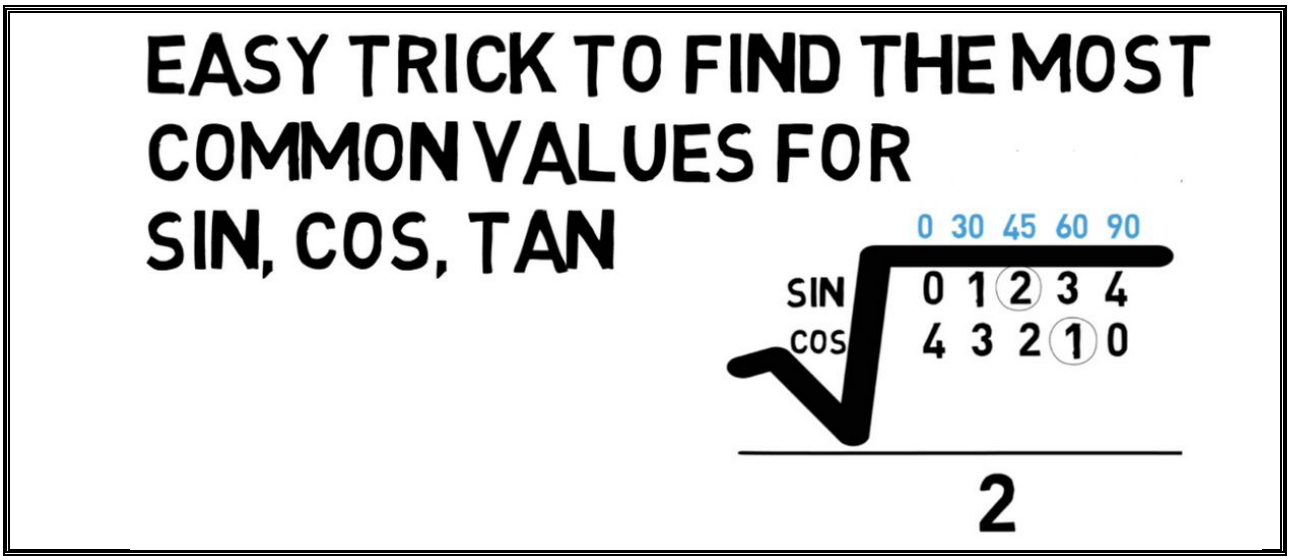
DAY 4

TRIGONOMETRIC RATIOS OF SOME SPECIAL ANGLES

T-Table for T-Ratios

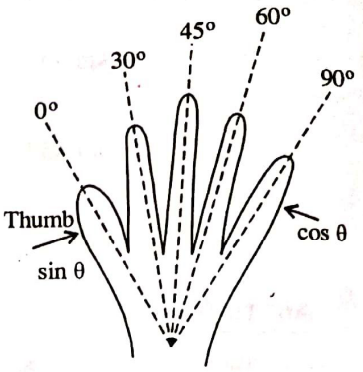
θ	0^0	30^0	45^0	60^0	90^0
$\sin\theta$	$\sqrt{\frac{0}{4}} = 0$	$\sqrt{\frac{1}{4}} = \frac{1}{2}$	$\sqrt{\frac{2}{4}} = \frac{1}{\sqrt{2}}$	$\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$	$\sqrt{\frac{4}{4}} = 1$
$\cos\theta$	$\sqrt{\frac{4}{4}} = 1$	$\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$	$\sqrt{\frac{2}{4}} = \frac{1}{\sqrt{2}}$	$\sqrt{\frac{1}{4}} = \frac{1}{2}$	$\sqrt{\frac{0}{4}} = 0$
$\tan\theta$	$\sqrt{\frac{0}{4-0}} = 0$	$\sqrt{\frac{1}{4-1}} = \frac{1}{\sqrt{3}}$	$\sqrt{\frac{2}{4-2}} = 1$	$\sqrt{\frac{3}{4-3}} = \sqrt{3}$	$\sqrt{\frac{4}{4-4}} = \infty$
$\cot\theta = \frac{1}{\tan\theta}$	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\sec\theta = \frac{1}{\cos\theta}$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
$\operatorname{cosec}\theta = \frac{1}{\sin\theta}$	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1



Hand Method For T-Table

$$\sin\theta \text{ and } \cos\theta = \frac{\sqrt{x}}{2}$$

where, x **= number of fingers towards T-ratio**



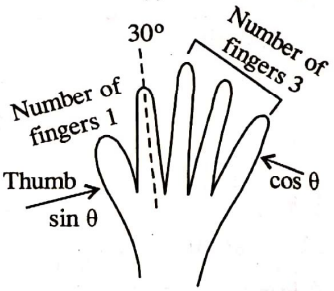
(i)

For 30°

$$\sin 30^\circ = \frac{\sqrt{x}}{2} = \frac{\sqrt{1}}{2} = \frac{1}{2}$$

$$\cos 30^\circ = \frac{\sqrt{x}}{2} = \frac{\sqrt{3}}{2}$$

$$\tan 30^\circ = \frac{\sin 30^\circ}{\cos 30^\circ} = \frac{1}{\sqrt{3}}$$



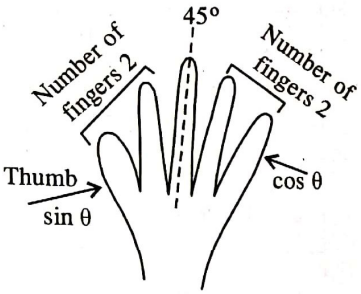
(ii)

For 45°

$$\sin 45^\circ = \frac{\sqrt{x}}{2} = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$$

$$\cos 45^\circ = \frac{\sqrt{x}}{2} = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$$

$$\tan 45^\circ = \frac{\sin 45^\circ}{\cos 45^\circ} = 1$$



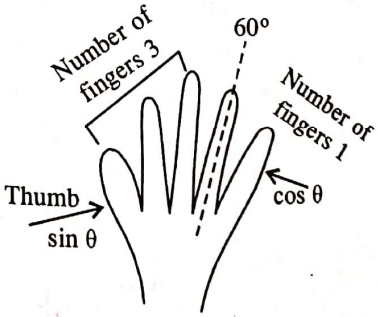
(iii)

For 60°

$$\sin 60^\circ = \frac{\sqrt{x}}{2} = \frac{\sqrt{3}}{2}$$

$$\cos 60^\circ = \frac{\sqrt{x}}{2} = \frac{\sqrt{1}}{2} = \frac{1}{2}$$

$$\tan 60^\circ = \frac{\sin 60^\circ}{\cos 60^\circ} = \sqrt{3}$$



(iv)

1. If $\sin\theta = \frac{1}{2}$, then find θ.

Sol:- $\sin\theta = \frac{1}{2} = \sin 30^0$ {As $\sin\theta$ is given, so we shall check the Table value in sin}

Now If T Ratios are equal then angles are also equal.

$\Rightarrow \theta = 30^0$

2. If $\tan A = \sqrt{3}$, then find A.

Sol:- $\tan A = \sqrt{3} = \tan 60^0$

Now If T Ratios are equal then angles are also equal.

$\Rightarrow A = 60^0$

3. Find the value of the following:

i) $\sin 45^0$ ii) $\cos 60^0$ iii) $\tan^2 30^0$

Sol:- i) $\sin 45^0 = \frac{1}{\sqrt{2}}$

ii) $\cos 60^0 = \frac{1}{2}$

iii) $\tan^2 30^0 = \left(\frac{1}{\sqrt{3}}\right)^2 = \frac{1}{\sqrt{3}} \times \frac{1}{\sqrt{3}} = \frac{1}{3}$

EXERCISE

1. If $\sin A = \frac{\sqrt{3}}{2}$, then find A.
2. If $\cos\theta = \frac{1}{\sqrt{2}}$, then find θ.
3. If $\tan\theta = 1$, then find θ.
4. If $\sec A = \frac{2}{\sqrt{3}}$, then find A.
5. Find the value of the following:

   i) $\sin 30^0$ ii) $\cos^2 45^0$ iii) $\tan^2 60^0$ iv) $\sec 30^0$ v) $\cos^2 60^0$