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F.Sc Math Part 1 Trigonometric Values Handout

Trigonometric Values Handout and Review Notes

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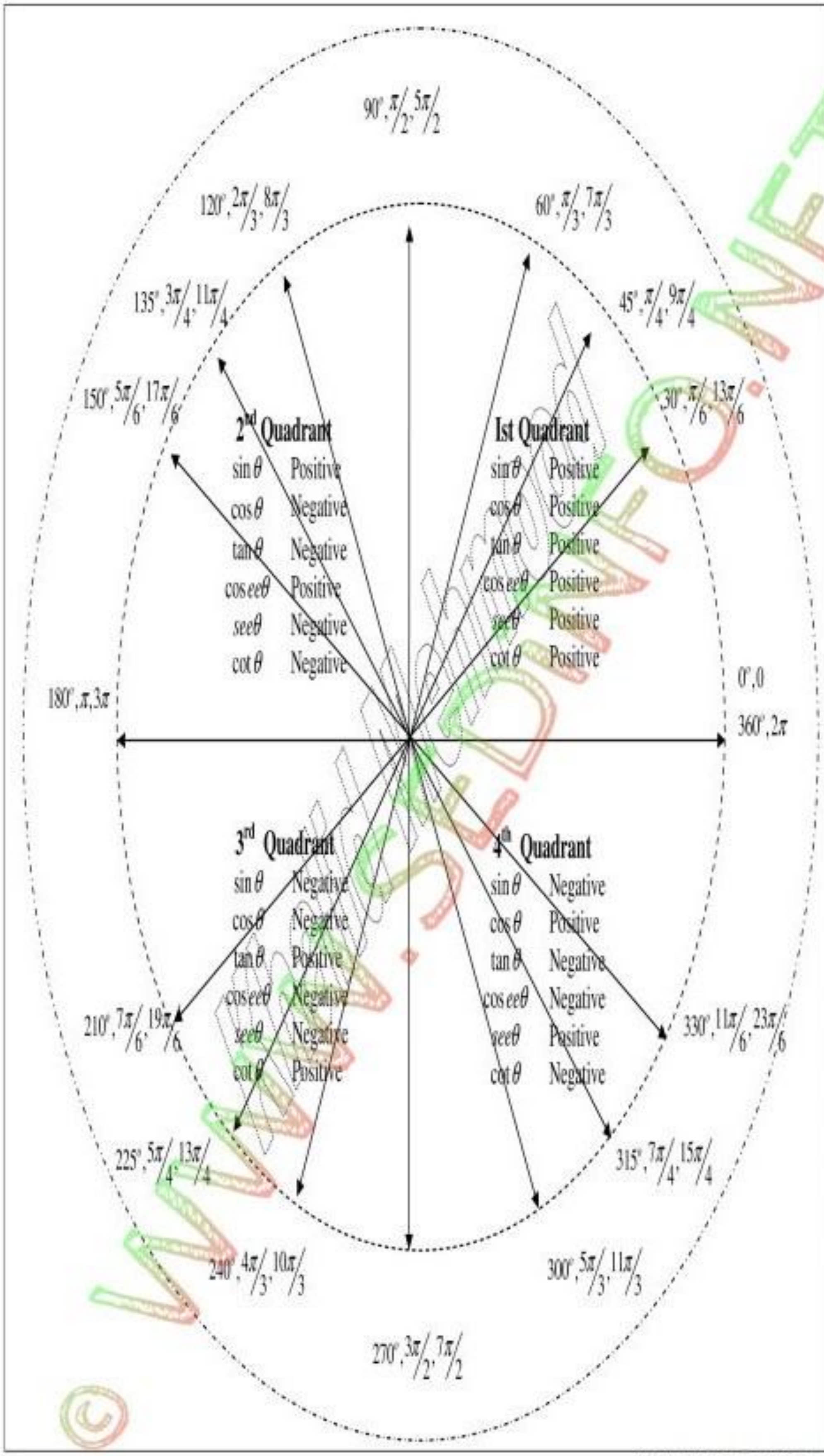
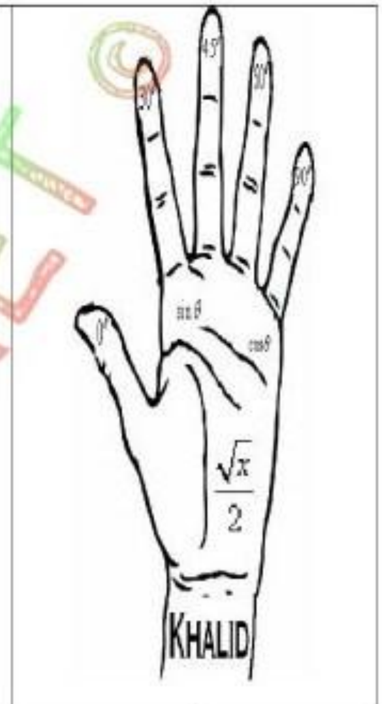
Anti clock wise			Table for various Trigonometric Functions						Clock wise		
θ	1st Round	2nd Round	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\operatorname{cosec}\theta$	$\sec\theta$	$\cot\theta$	θ	1st Round	2nd Round
0°	0	2π	0	1	0	∞	1	∞	360°	2π	4π
30°	$\pi/6$	$13\pi/6$	$1/2=0.5$	$\sqrt{3}/2=0.866$	$1/\sqrt{3}=0.577$	2	$2/\sqrt{3}=1.155$	$\sqrt{3}=1.732$	330°	$11\pi/6$	$23\pi/6$
45°	$\pi/4$	$9\pi/4$	$1/\sqrt{2}=0.707$	$1/\sqrt{2}=0.707$	1	$\sqrt{2}=1.414$	$\sqrt{2}=1.414$	$\sqrt{2}=1.414$	315°	$7\pi/4$	$15\pi/4$
60°	$\pi/3$	$7\pi/3$	$\sqrt{3}/2=0.866$	$1/2=0.5$	$\sqrt{3}=1.732$	$2/\sqrt{3}=1.155$	2	$1/\sqrt{3}=0.577$	300°	$5\pi/3$	$11\pi/3$
90°	$\pi/2$	$5\pi/2$	1	0	∞	1	∞	0	270°	$3\pi/2$	$7\pi/2$
120°	$2\pi/3$	$8\pi/3$	$\sqrt{3}/2=0.866$	$-1/2=-0.5$	$-\sqrt{3}=-1.732$	$2/\sqrt{3}=1.155$	-2	$-1/\sqrt{3}=-0.577$	240°	$4\pi/3$	$10\pi/3$
135°	$3\pi/4$	$11\pi/4$	$1/\sqrt{2}=0.707$	$-1/\sqrt{2}=-0.707$	-1	$\sqrt{2}=1.414$	$-\sqrt{2}=-1.414$	-1	225°	$5\pi/4$	$13\pi/4$
150°	$5\pi/6$	$17\pi/6$	$1/2=0.5$	$-\sqrt{3}/2=-0.866$	$-1/\sqrt{3}=-0.577$	2	$-2/\sqrt{3}=-1.155$	$-\sqrt{3}=-1.732$	210°	$7\pi/6$	$19\pi/6$
180°	π	3π	0	-1	0	∞	-1	∞	180°	π	3π
210°	$7\pi/6$	$19\pi/6$	$-1/2=-0.5$	$-\sqrt{3}/2=-0.866$	$1/\sqrt{3}=0.577$	-2	$-2/\sqrt{3}=-1.155$	$\sqrt{3}=1.732$	150°	$5\pi/6$	$17\pi/6$
225°	$5\pi/4$	$13\pi/4$	$-1/\sqrt{2}=-0.707$	$-1/\sqrt{2}=-0.707$	1	$-\sqrt{2}=-1.414$	$-\sqrt{2}=-1.414$	1	135°	$3\pi/4$	$11\pi/4$
240°	$4\pi/3$	$10\pi/3$	$-\sqrt{3}/2=-0.866$	$-1/2=-0.5$	$\sqrt{3}=1.732$	$-2/\sqrt{3}=-1.155$	-2	$1/\sqrt{3}=0.577$	120°	$2\pi/3$	$8\pi/3$
270°	$3\pi/2$	$7\pi/2$	-1	0	∞	-1	∞	0	90°	$\pi/2$	$5\pi/2$
300°	$5\pi/3$	$11\pi/3$	$-\sqrt{3}/2=-0.866$	$1/2=0.5$	$-\sqrt{3}=-1.732$	$-2/\sqrt{3}=-1.155$	2	$-\sqrt{3}=-1.732$	60°	$\pi/3$	$7\pi/3$
315°	$7\pi/4$	$15\pi/4$	$-1/\sqrt{2}=-0.707$	$1/\sqrt{2}=0.707$	-1	$-\sqrt{2}=-1.414$	$\sqrt{2}=1.414$	-1	45°	$\pi/4$	$9\pi/4$
330°	$11\pi/6$	$23\pi/6$	$-1/2=-0.5$	$\sqrt{3}/2=0.866$	$-1/\sqrt{3}=-0.577$	-2	$2/\sqrt{3}=1.155$	$-\sqrt{3}=-1.732$	30°	$\pi/6$	$13\pi/6$
360°	2π	4π	0	1	0	∞	1	∞	0°	0	2π





SOH ⇒	$\sin\theta = \frac{Opposite}{hypotenuse}$
CAH ⇒	$\cos\theta = \frac{Adjacent}{hypotenuse}$
TOA ⇒	$\tan\theta = \frac{Opposite}{Adjacent}$

If we have to find trigonometric ratio of sin 60 then we will fold ring finger (finger of 60) and count how many finger are there left side of the folded finger that are three so $\sin 60° = \frac{\sqrt{3}}{2}$ in this way when we count how many fingers are right side of the folded finger that is only one finger so $\cos 60° = \frac{\sqrt{1}}{2} = \frac{1}{2}$

Important Trigonometric Formulas

TEXTBOOK OF ALGEBRA AND TRIGONOMETRY FOR CLASS XI
Available online @ WWW.SEDiNFO.NET Version: 1.0.2

- $\sin^2\theta + \cos^2\theta = 1$
- $1+\tan^2\theta = \sec^2\theta$
- $1+\cot^2\theta = \csc^2\theta$
- $\sin(-\theta) = -\sin\theta$
- $\cos(-\theta) = \cos\theta$
- $\tan(-\theta) = -\tan\theta$

- $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$
- $\sin(\alpha-\beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$
- $\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$
- $\cos(\alpha-\beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$
- $\tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1-\tan\alpha\tan\beta}$
- $\tan(\alpha-\beta) = \dfrac{\tan\alpha - \tan\beta}{1+\tan\alpha\tan\beta}$

- $\sin 2\theta = 2\sin\theta\cos\theta$
- $\cos 2\theta = \cos^2\theta - \sin^2\theta$
- $\tan 2\theta = \dfrac{2\tan\theta}{1-\tan^2\theta}$

- $\sin^2\dfrac{\theta}{2} = \dfrac{1-\cos\theta}{2}$
- $\cos^2\dfrac{\theta}{2} = \dfrac{1+\cos\theta}{2}$
- $\tan^2\dfrac{\theta}{2} = \dfrac{1-\cos\theta}{1+\cos\theta}$

- $\sin 3\theta = 3\sin\theta - 4\sin^3\theta$
- $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$
- $\tan 3\theta = \dfrac{3\tan\theta - \tan^3\theta}{1-3\tan^2\theta}$

- $\sin 2\theta = \dfrac{2\tan\theta}{1+\tan^2\theta}$
- $\cos 2\theta = \dfrac{1-\tan^2\theta}{1+\tan^2\theta}$

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

- $\sin\theta + \sin\phi = 2\sin\dfrac{\theta+\phi}{2}\cos\dfrac{\theta-\phi}{2}$
- $\sin\theta - \sin\phi = 2\cos\dfrac{\theta+\phi}{2}\sin\dfrac{\theta-\phi}{2}$
- $\cos\theta + \cos\phi = 2\cos\dfrac{\theta+\phi}{2}\cos\dfrac{\theta-\phi}{2}$
- $\cos\theta - \cos\phi = -2\sin\dfrac{\theta+\phi}{2}\sin\dfrac{\theta-\phi}{2}$

- $\sin^{-1}A + \sin^{-1}B = \sin^{-1}\left(A\sqrt{1-B^2} + B\sqrt{1-A^2}\right)$
- $\sin^{-1}A - \sin^{-1}B = \sin^{-1}\left(A\sqrt{1-B^2} - B\sqrt{1-A^2}\right)$
- $\cos^{-1}A + \cos^{-1}B = \cos^{-1}\left(AB - \sqrt{(1-A^2)(1-B^2)}\right)$
- $\cos^{-1}A - \cos^{-1}B = \cos^{-1}\left(AB + \sqrt{(1-A^2)(1-B^2)}\right)$
- $\tan^{-1}A + \tan^{-1}B = \tan^{-1}\dfrac{A+B}{1-AB}$
- $\tan^{-1}A - \tan^{-1}B = \tan^{-1}\dfrac{A-B}{1+AB}$

Three Steps to solve $\sin\left(n\cdot\dfrac{\pi}{2}\pm\theta\right)$

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Step I: First check that *n* is even or odd

Step II: If *n* is even then the answer will be in *sin* and if the *n* is odd then *sin* will be converted to *cos* and vice virsa (i.e. *cos* will be converted to *sin*).

Step III: Now check in which quadrant $n\cdot\dfrac{\pi}{2}\pm\theta$ is lying if it is in *Ist* or *IInd* quadrant the answer will be positive as *sin* is positive in these quadrants and if it is in the *IIIrd* or *IVth* quadrant the answer will be negative.

e.g. $\sin 667^\circ = \sin(7(90)+37)$

Since n = 7 is odd so answer will be in *cos* and 667 is in *IVth* quadrant and *sin* is –ive in *IVth* quadrant therefore answer will be in negative. i.e $\sin 667^\circ = -\cos 37^\circ$

Similar technique is used for other trigonometric ratios. i.e $\tan \rightleftarrows \cot$ and $\sec \rightleftarrows \csc$.