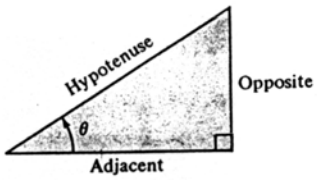
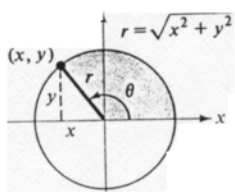
TRIGONOMETRY REVIEW SHEET

Right triangle:



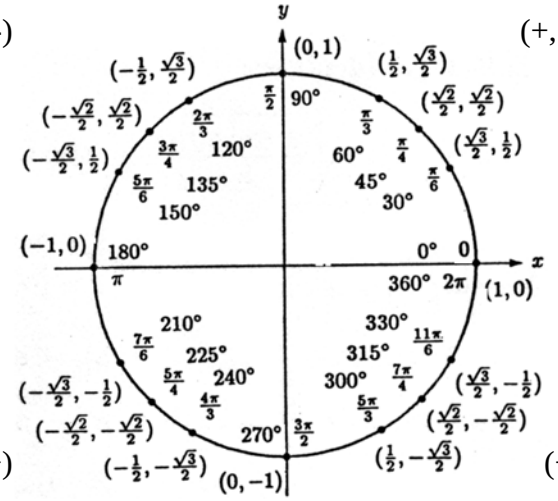
Circular function:



Unit Circle:

$(\cos\theta, \sin\theta, \tan\theta)$

(-, +, -) (+, +, +)



(-, -, +) (+, -, -)

Fundamental Identities:

$\sin\theta = \dfrac{opp.}{hyp.} = \dfrac{y}{r}$

$\cos\theta = \dfrac{adj.}{hyp.} = \dfrac{x}{r}$

$\tan\theta = \dfrac{opp.}{adj.} = \dfrac{y}{x}$

$\csc\theta = \dfrac{1}{\sin\theta} = \dfrac{hyp.}{opp.} = \dfrac{r}{y}$

$\sec\theta = \dfrac{1}{\cos\theta} = \dfrac{hyp.}{adj.} = \dfrac{r}{x}$

$\cot\theta = \dfrac{1}{\tan\theta} = \dfrac{adj.}{opp.} = \dfrac{x}{y}$

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

Negative Angle Identities:

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

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

Addition and Subtracting Identities:

$\sin(A + B) = \sin A \cos B + \sin B \cos A$

$\cos(A + B) = \cos A \cos B - \sin A \sin B$

$\sin(A - B) = \sin A \cos B - \sin B \cos A$

$\cos(A - B) = \cos A \cos B + \sin A \sin B$

$\tan(A + B) = \dfrac{\tan A + \tan B}{1 - \tan A \tan B}$

$\tan(A - B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$

Double Angle Identitities:

$\sin(2\theta) = 2\sin\theta\cos\theta$

$\tan(2\theta) = \dfrac{2\tan\theta}{1-\tan^2\theta}$

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

$= 2\cos^2\theta - 1$

$= 1 - 2\sin^2\theta$

Half-Angle Identities:

$\sin(\frac{\theta}{2}) = \pm\sqrt{\dfrac{1-\cos\theta}{2}}$ $\quad$ $\cos(\frac{\theta}{2}) = \pm\sqrt{\dfrac{1+\cos\theta}{2}}$ $\quad$ $\tan(\frac{\theta}{2}) = \pm\sqrt{\dfrac{1-\cos\theta}{1+\cos\theta}}$

Product Identities:

$\sin A\cos B = \frac{1}{2}[\sin(A+B)+\sin(A-B)]$

$\cos A\sin B = \frac{1}{2}[\sin(A+B)-\sin(A-B)]$

$\cos A\cos B = \frac{1}{2}[\cos(A-B)+\cos(A+B)]$

$\sin A\sin B = \frac{1}{2}[\cos(A-B)-\cos(A+B)]$

Sum Identities:

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

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

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

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

Power-Reducing Identities:

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

Cofunction Identities:

$\sin(\frac{\pi}{2}+A) = \cos A$ $\quad$ $\sec(\frac{\pi}{2}-A) = \csc A$ $\quad$ $\tan(\frac{\pi}{2}-A) = \cot A$

$\cos(\frac{\pi}{2}-A) = \sin A$ $\quad$ $\csc(\frac{\pi}{2}-A) = \sec A$ $\quad$ $\cot(\frac{\pi}{2}-A) = \tan A$

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