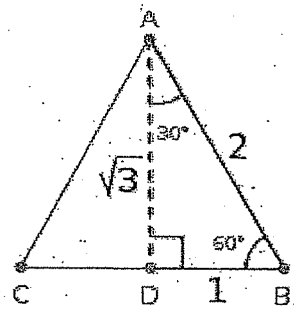
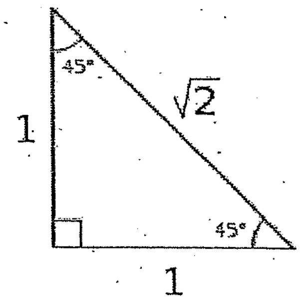
Special Triangles and Triangle Formulas

Degrees	Radians	sin	cos	tan
0	0	0	1	0
30	π / 6	1 / 2	√3 / 2	√3 / 3
45	π / 4	√2 / 2	√2 / 2	1
60	π / 3	√3 / 2	1/2	√3
90	π / 2	1	0	-





Function	Abbreviation	Description	Identities (using radians)
Sine	sin	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\sin\theta \equiv \cos\left(\frac{\pi}{2}-\theta\right) \equiv \frac{1}{\csc\theta}$
Cosine	cos	$\frac{\text{adjacent}}{\text{hypotenuse}}$	$\cos\theta \equiv \sin\left(\frac{\pi}{2}-\theta\right) \equiv \frac{1}{\sec\theta}$
Tangent	tan (or tg)	$\frac{\text{opposite}}{\text{adjacent}}$	$\tan\theta \equiv \frac{\sin\theta}{\cos\theta} \equiv \cot\left(\frac{\pi}{2}-\theta\right) \equiv \frac{1}{\cot\theta}$
Cotangent	cot (or ctg or ctn)	$\frac{\text{adjacent}}{\text{opposite}}$	$\cot\theta \equiv \frac{\cos\theta}{\sin\theta} \equiv \tan\left(\frac{\pi}{2}-\theta\right) \equiv \frac{1}{\tan\theta}$
Secant	sec	$\frac{\text{hypotenuse}}{\text{adjacent}}$	$\sec\theta \equiv \csc\left(\frac{\pi}{2}-\theta\right) \equiv \frac{1}{\cos\theta}$
Cosecant	csc (or cosec)	$\frac{\text{hypotenuse}}{\text{opposite}}$	$\csc\theta \equiv \sec\left(\frac{\pi}{2}-\theta\right) \equiv \frac{1}{\sin\theta}$

REMEMBER	THEN	TO **DERIVE**
$\sin^2\theta + \cos^2\theta = 1$	Divide by $\cos^2\theta$	$\tan^2\theta + 1 = \sec^2\theta$
	Divide by $\sin^2\theta$	$1 + \cot^2\theta = \csc^2\theta$
$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$	Substitute A for B(+)	$\sin(2A) = 2\sin A \cos A$
$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$	Use A-B, let B=(-A)	$\cos(2A) = \cos^2 A - \sin^2 A$
	Substitute for $\cos^2$	$= 1 - 2\sin^2 A$
	Substitute for $\sin^2$	$= 2\cos^2 A - 1$
$\sin^2\theta = \frac{1-\cos(2\theta)}{2}$	$\sin\theta = \pm\sqrt{\frac{1-\cos 2\theta}{2}}$	$\sin\frac{\theta}{2} = \pm\sqrt{\frac{1-\cos\theta}{2}}$
$\cos^2\theta = \frac{1+\cos(2\theta)}{2}$	$\cos\theta = \pm\sqrt{\frac{1+\cos 2\theta}{2}}$	$\cos\frac{\theta}{2} = \pm\sqrt{\frac{1+\cos\theta}{2}}$
$\tan\theta = \frac{\sin\theta}{\cos\theta}$	Therefore, $\tan^2\theta = \frac{\sin^2\theta}{\cos^2\theta}$	

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Geometry formulas

Line Midpoint	$M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$		
Line Slope	$m = \frac{y_2-y_1}{x_2-x_1}$		
Distance Formula	$d = \sqrt[2]{(x_2 - x_1)^2 + (y_2 - y_2)^2}$		
Slope-Intercept Form	$y = mx + b$		
Point-Slope Form	$y - y_1 = m(x - x_1)$		
Arc	$A = \frac{1}{2}r^2\theta$		
Circle	$A = \pi r^2$	$C = 2\pi r$	
Triangle	$A = \frac{1}{2}bh$	$Angle\ Sum = 180°$	
Right Triangle	$A = \frac{1}{2}ab$	$a^2 + b^2 = c^2$	$x = \frac{-b\pm\sqrt{b^2-4ac}}{2a}$
Isosceles Triangle	$A = \frac{\sqrt{3}}{4}a^2$		
Square	$P = 4s$	$A = s^2$	
Rectangle	$P = 2a + 2b$	$A = ab$	
Parallelogram	$P = 2a + 2b$	$A = bh$	
Trapezoid	$P = a + b + c + d$	$A = \frac{1}{2}(a + b)h$	
Regular n-gon	$P = ns$	$A = \frac{1}{2}rP$	
Right Regular Prism	$S = 2(ab + ac + bc)$	$V = abc$	
Cube	$S = 6s^2$	$V = s^3$	
Right Prism	$S = 2A + Ph$	$V = Ah$	
Right Regular Pyramid	$S = A + \frac{1}{2}Cl$	$V = \frac{1}{3}Ah$	
Rt. Circular Cylinder	$S = 2A + Ch = 2\pi r^2 + 2\pi rh$	$V = Ah = (\pi r^2)h$	
Rt. Circular Cone	$S = A + \frac{1}{2}Cl$	$V = \frac{1}{3}Ah = \frac{1}{3}\pi r^2 h$	
Sphere	$S = 4\pi r^2$	$V = \frac{4}{3}\pi r^3$	
Angle Sum of a Polygon	$= 180(n - 2)$		
Heron's formula:	$A = \sqrt{s(s-a)(s-b)(s-c)}$	where $s = \frac{a+b+c}{2}$	
Euler's formula:	$Faces + Vertices = Edges + 2$		