SRI AKILANDESWARI WOMEN'S COLLEGE, WANDIWASH

CLASS : I UG MATHEMATICS

E SAMUNDEESWARI

ASSISTANT PROFESSOR
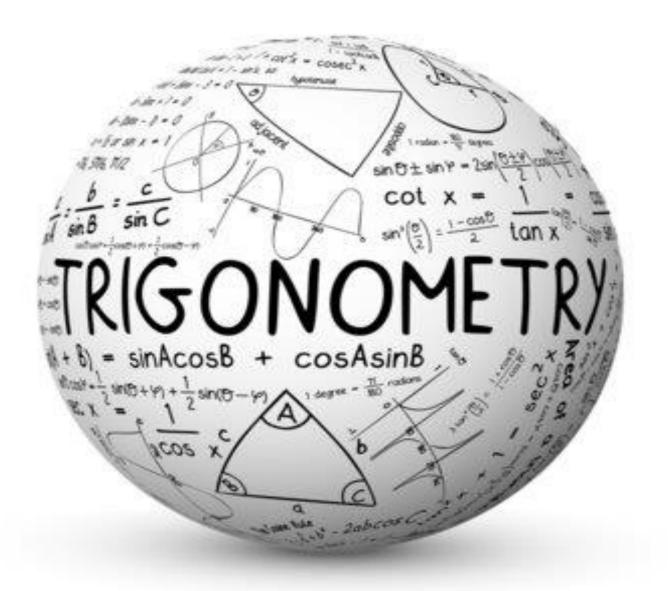
DEPARTMENT OF MATHEMATICS

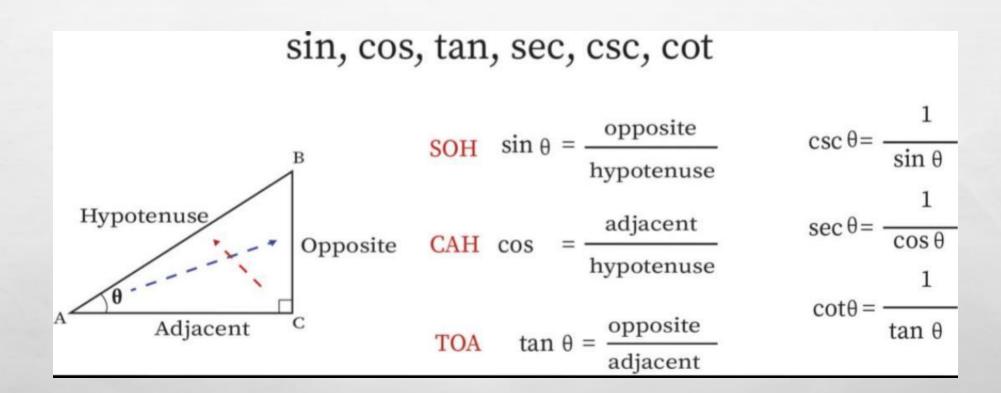SWAMY ABEDHANADHA EDUCATIONAL TRUST, WANDIWASH

MATHS

FORMULA

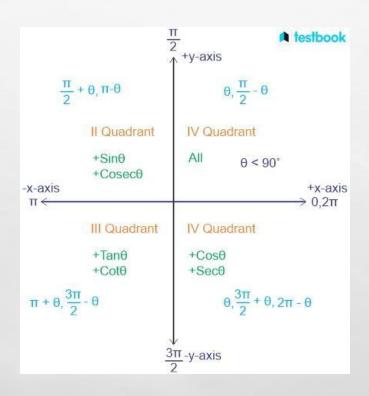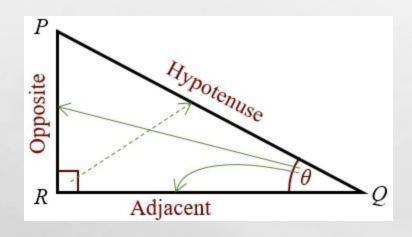# TRIGONOMETRY RATIOS:

sin, cos, tan, sec, csc, cot

SOH $\sin \theta = \dfrac{\text{opposite}}{\text{hypotenuse}}$

CAH $\cos = \dfrac{\text{adjacent}}{\text{hypotenuse}}$

TOA $\tan \theta = \dfrac{\text{opposite}}{\text{adjacent}}$

$\csc \theta = \dfrac{1}{\sin \theta}$

$\sec \theta = \dfrac{1}{\cos \theta}$

$\cot \theta = \dfrac{1}{\tan \theta}$

QUADRANT
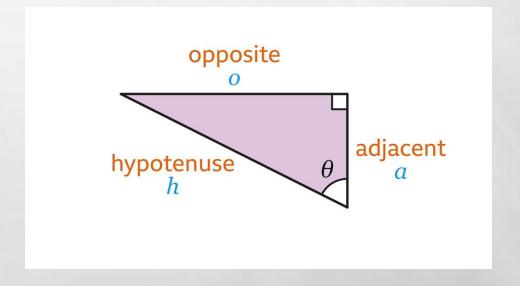
TRIGONOMETRIC RATIOS OF 0° AND 90°

Basic Trigonometric Formulas

In Right Triangle ABC

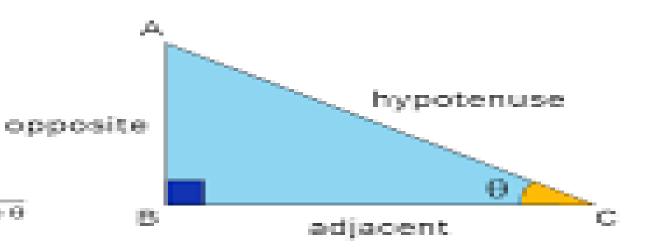$$\sin \theta = \frac{\text{side opposite to angle } \theta}{\text{hypotenuse}}$$

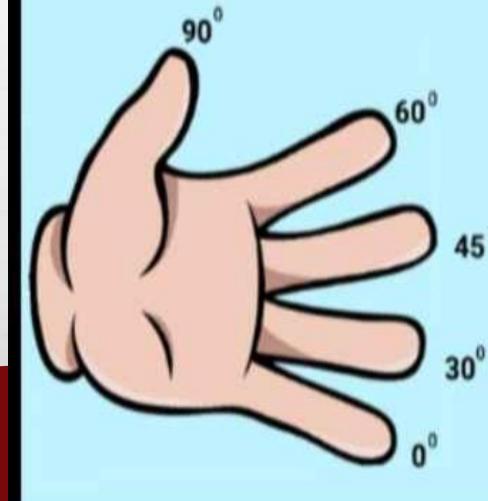$$\cos \theta = \frac{\text{side adjacent to angle } \theta}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{side opposite to angle } \theta}{\text{side adjacent to angle } \theta}$$

$$\csc \theta = \frac{1}{\sin \theta} = \frac{\text{hypotenuse}}{\text{side opposite to angle } \theta}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hypotenuse}}{\text{side adjacent to angle } \theta}$$

$$\cot \theta = \frac{1}{\tan \theta} = \frac{\text{side adjacent to angle } \theta}{\text{side opposite to angle } \theta}$$

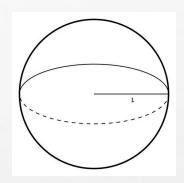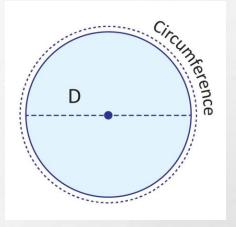| angle θ ratio	0°	30°	45°	60°	90°
$\sin \theta$	0	$\dfrac{1}{2}$	$\dfrac{\sqrt{2}}{2}$	$\dfrac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{\sqrt{2}}{2}$	$\dfrac{1}{2}$	0
$\tan \theta$	0	$\dfrac{\sqrt{3}}{3}$	1	$\sqrt{3}$	not defined
$\csc \theta$	not defined	2	$\sqrt{2}$	$\dfrac{2\sqrt{3}}{3}$	1
$\sec \theta$	1	$\dfrac{2\sqrt{3}}{3}$	$\sqrt{2}$	2	not defined
$\cot \theta$	not defined	$\sqrt{3}$	1	$\dfrac{\sqrt{3}}{3}$	0
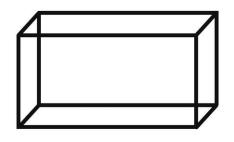
TRIGONOMETRIC RATIOS FOR COMPLEMENTARY ANGLES
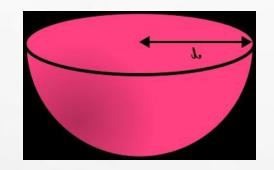
Angle/ Function	$-\theta$	$90°-\theta$ or $\dfrac{\pi}{2}-\theta$	$90°+\theta$ or $\dfrac{\pi}{2}+\theta$	$180°-\theta$ or $\pi-\theta$	$180°+\theta$ or $\pi+\theta$	$270°-\theta$ or $\dfrac{3\pi}{2}-\theta$	$270°+\theta$ or $\dfrac{3\pi}{2}+\theta$	$360°-\theta$ or $2\pi-\theta$	$360°+\theta$ or $2\pi+\theta$
Sine	$-\sin\theta$	$\cos\theta$	$\cos\theta$	$\sin\theta$	$-\sin\theta$	$-\cos\theta$	$-\cos\theta$	$-\sin\theta$	$\sin\theta$
Cosine	$\cos\theta$	$\sin\theta$	$-\sin\theta$	$-\cos\theta$	$-\cos\theta$	$-\sin\theta$	$\sin\theta$	$\cos\theta$	$\cos\theta$
tangent	$-\tan\theta$	$\cot\theta$	$-\cot\theta$	$-\tan\theta$	$\tan\theta$	$\cot\theta$	$-\cot\theta$	$-\tan\theta$	$\tan\theta$
cotangent	$-\cot\theta$	$\tan\theta$	$-\tan\theta$	$-\cot\theta$	$\cot\theta$	$\tan\theta$	$-\tan\theta$	$-\cot\theta$	$\cot\theta$
secant	$\sec\theta$	$\mathrm{cosec}\,\theta$	$-\mathrm{cosec}\,\theta$	$-\sec\theta$	$-\sec\theta$	$-\mathrm{cosec}\,\theta$	$\mathrm{cosec}\,\theta$	$\sec\theta$	$\sec\theta$
cosecant	$-\mathrm{cosec}\,\theta$	$\sec\theta$	$\sec\theta$	$\mathrm{cosec}\,\theta$	$-\mathrm{cosec}\,\theta$	$-\sec\theta$	$-\sec\theta$	$-\mathrm{cosec}\,\theta$	$\mathrm{cosec}\,\theta$

MENSURATION

Cosine Law

$$a^2 = b^2 + c^2 - 2bc \cos A$$
$$b^2 = c^2 + a^2 - 2ca \cos A$$
$$c^2 = a^2 + b^2 - 2ab \cos A$$
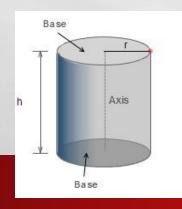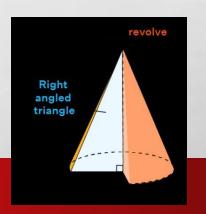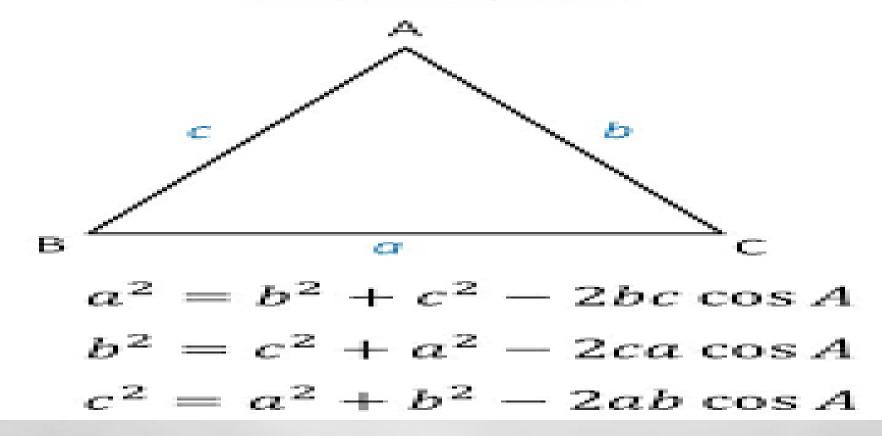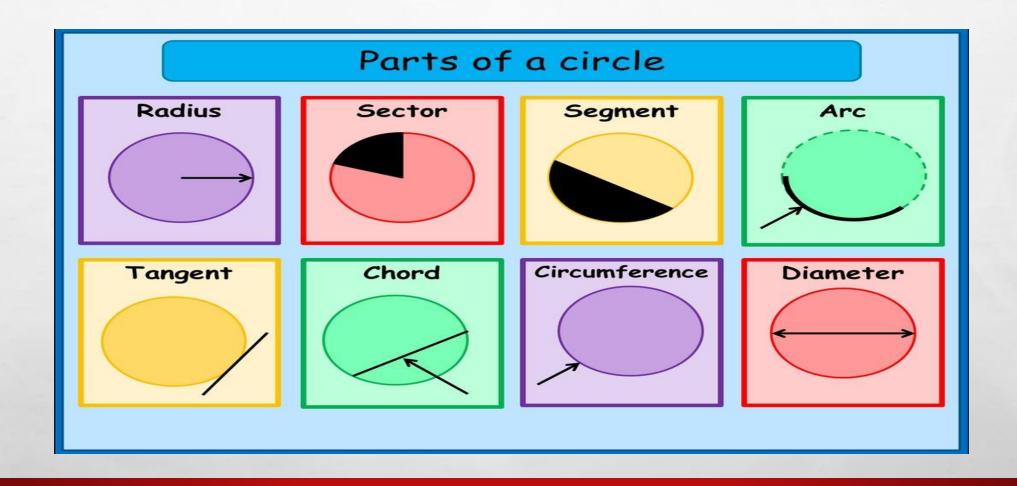
FORMULA FOR CIRCLE:

Figures		Area	Perimeter	
Circle		πr^2 or $\dfrac{\pi d^2}{4}$	$2\pi r$ or πd	r : radius d : diameter $\pi = \dfrac{22}{7}$ or 3.14
Semicircle		$\dfrac{\pi r^2}{2}$	$\pi r + 2r$	
Quadrant		$\dfrac{\pi r^2}{4}$	$\dfrac{\pi r}{2} + 2r$	

PARTS OF A CIRCLE:

FORMULA:

Name	Figure	Curved Surface area	Total surface area	Volume
Cuboid		$2h(l+b)$	$2(lb+bh+lh)$	lbh
Cube		$4a^2$	$6a^2$	a^3
Right circular cylinder		$2\pi rh$	$2\pi r(r+h)$	πr^2h
Right circular cone		πrl	$\pi r(l+r)$	$\frac{1}{3}\pi r^2h$
Sphere		$-$	$4\pi r^2$	$\left(\frac{4}{3}\right)\pi r^3$
Hemi-sphere		$2\pi r^2$	$3\pi r^2$	$\left(\frac{2}{3}\right)\pi r^3$

THANK YOU 💐