

Trigonometry  $\Rightarrow$  measure of triangle  
 "Hipparchus"  $\Rightarrow$  father of trig

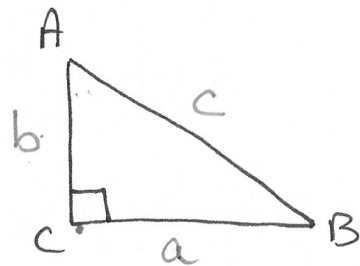
TRIG RATIOS: relationship between the angles of a right  $\Delta$  & the sides

3 Basic SOH CAH TOA

Sine =  $\frac{\text{OPP}}{\text{hyp}}$   
 (sin)

Cosine =  $\frac{\text{adj (leg)}}{\text{hyp}}$   
 (cos)

Tangent =  $\frac{\text{OPP}}{\text{adj}}$   
 (tan)



[ Capital letter - Angles  
 lower case - sides  
 across from each other  
 (opposite) other

\* sides are determine based on starting angle.

Sine A = $\frac{a}{c}$	Sin B = $\frac{b}{c}$	Sin C = $\frac{c}{c} = 1$
Cos A = $\frac{b}{c}$	Cos B = $\frac{a}{c}$	Cos C = $\frac{0}{c} = 0$
Tan A = $\frac{a}{b}$	tan B = $\frac{b}{a}$	tan C = $\frac{c}{0}$

IND

3 reciprocal trig Ratios

Sin =  $\frac{O}{H}$       Cosecant / csc =  $\frac{H}{O}$

Cos =  $\frac{A}{H}$       Secant / sec =  $\frac{H}{A}$

tan =  $\frac{O}{A}$       cotangent / cot =  $\frac{A}{O}$

CALC: trig values

sin 40° = .643  
 tan 12° = .213 } calculator

CALC on angle:  $\theta$  = "theta"

angle measure

sin  $\theta$  = .217

sin<sup>-1</sup> sin  $\theta$  = sin<sup>-1</sup> .217  
 (inverse)

$\theta$  = 13°

\* to calc an angle use inverse

cos  $\theta$  = .843

$\theta$  = 33°

Find missing sides & missing angles

ex:  $\cos 12 = \frac{x}{7}$

$x = 7 \cdot \cos 12$

$x = 6.8$

$\tan 41 = \frac{7}{x}$   
switch

$x = \frac{7}{\tan 41}$

$x = 8.1$

\* var in Num = multiply  
var in denom = divide

ex:  $\cos \theta = \frac{6}{11}$

$\theta = \cos^{-1}(\frac{6}{11})$

$\theta = 57^\circ$

$\sin \theta = \frac{11}{13} \quad \theta = 58^\circ$

$\sin^{-1}(\frac{11}{13})$

\* Note!

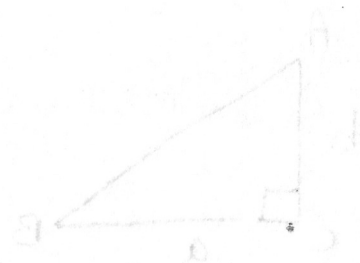
$\cos \theta = 1.347$   
not possible

$\cos = \frac{A}{H} < 1$

$\sin = \frac{O}{H} < 1$

opposite to angle = pitheagoriff  
adj to what is "adjacent"

There are two sides adjacent to the angle  
other side is hyp



$\frac{opp}{hyp} = \sin$

$\frac{adj}{hyp} = \cos$

$\frac{opp}{adj} = \tan$

adj = adjacent side  
opp = opposite side  
hyp = hypotenuse  
(shorter)

$1 = \frac{1}{1} = 1$  not  
 $0 = \frac{0}{1} = 0$  not  
 $2 = \frac{2}{1} = 2$  not  
 $0 = \frac{0}{1} = 0$  not