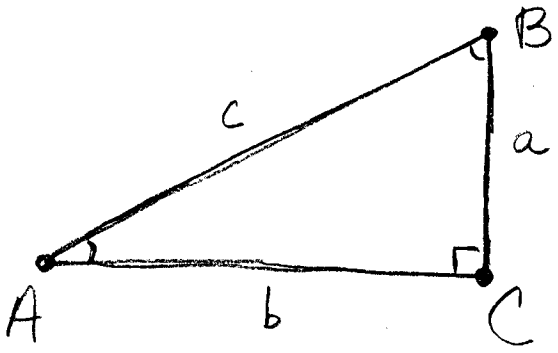
Alg I-BE COPY FOR NOTES: [3-28-11]

More "Right triangle" vocabulary:



A, B, C = angles
a, b, c = sides

⇒ side b is adjacent to ∠A
(next to) (angle A)

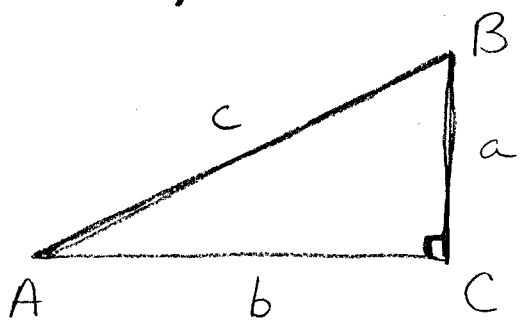
⇒ side a is opposite to ∠A
(across from)

⇒ side a is adjacent to ∠B

⇒ side b is opposite to ∠B

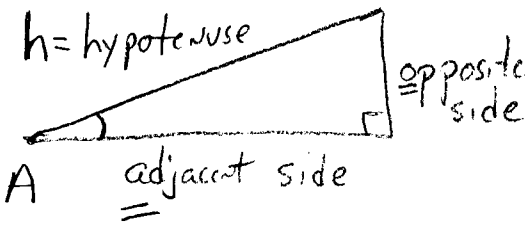
Only the angles A and B have sides that are referred to as adjacent. We never, for example, refer to side b as adjacent to ∠C. Also, we do not refer to side c as opposite ∠C, we refer to it by its name, the hypotenuse.

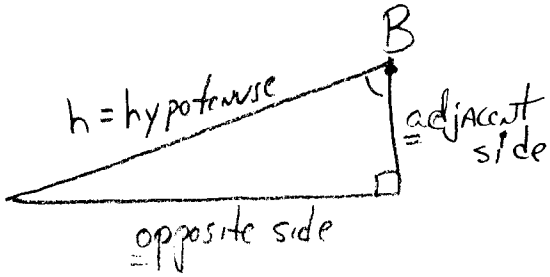
Another way to look at it:



$\Rightarrow \angle A$ has adjacent side b and opposite side a

$\Rightarrow \angle B$ has adjacent side a and opposite side b

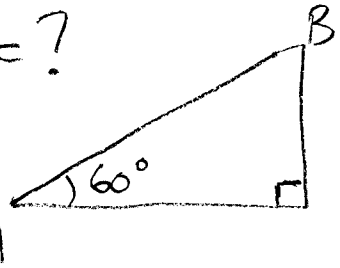




$\angle A$ and $\angle B$ are the two acute angles (less than 90°) in any right triangle.

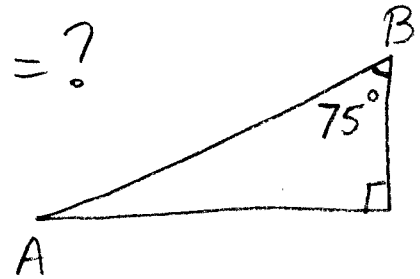
If you know $\angle A$, you know $\angle B$ and vice versa

(Ex) B = ?



$m\angle B = 30°$

(Ex) A = ?

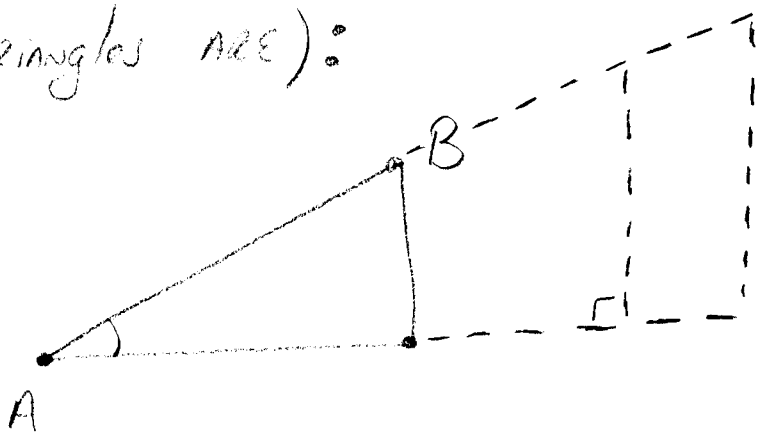


$m\angle A = 15°$

A BASIC property of right triangles:

FOR ANY right triangles that ARE SIMILAR (ALL ANGLES EQUAL)

THE following RATIO's ARE ALWAYS THE SAME Number (NO matter how big or small the triangles ARE):



ALL RIGHT △ WITH ∠A, ∠B ARE SIMILAR, SO SIDES ARE IN THIS SAME PROPORTIONS!

FOR ∠A

$\frac{\text{OPPOSITE}}{\text{hypotenuse}}$

$\frac{\text{adjacent}}{\text{hypotenuse}}$

$\frac{\text{OPPOSITE}}{\text{ADJACENT}}$

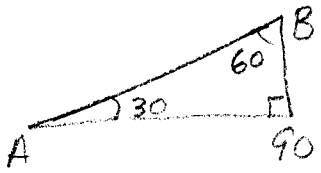
For ∠B

$\frac{\text{OPPOSITE}}{\text{hypotenuse}}$

$\frac{\text{adjacent}}{\text{hypotenuse}}$

$\frac{\text{OPPOSITE}}{\text{ADJACENT}}$

Ex



For ∠A $\frac{O}{H} = 0.5$

$\frac{a}{H} \cong .866$

$\frac{O}{a} \cong .577$

For ∠B $\frac{O}{H} \cong .866$

$\frac{a}{H} = .5$

$\frac{O}{a} \cong 1.732$

Since these RATIOS ARE THE SAME FOR ANY $\angle A$ or $\angle B$ in a Right TRIANGLE, they can be used to find the length of any of the sides of a Right triangle if you know $\angle A$ OR $\angle B$.

These RATIOS used to be found in large tables in the back of every math book, now every scientic CALCULATOR has them "built in". These RATIOS have NAMES.

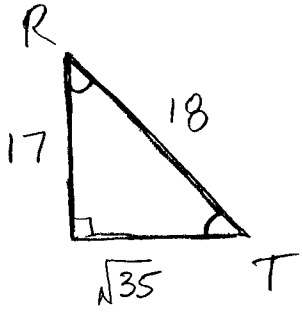
		ABBREVIATION
Sine of $\angle A$ or $\angle B$ =	$\frac{\text{OPPOSITE}}{\text{hypotenuse}}$	SIN
Cosine of $\angle A$ or $\angle B$ =	$\frac{\text{Adjacent}}{\text{hypotenuse}}$	COS
TANGENT of $\angle A$ or $\angle B$ =	$\frac{\text{OPPOSITE}}{\text{adjacent}}$	TAN

*(M) SOHCAHTOA

EX 1 Pg 624

(EX) FIND THE SINE, COSINE, AND TANGENT OF LR AND LT

SINE = SIN = $\frac{O}{H}$	"SOHCAHTOA"
COSINE = COS = $\frac{A}{H}$	
TANGENT = TAN = $\frac{O}{A}$	



TO NEAREST THOUSANDTH

$\sin R = \frac{O}{H} = \frac{\sqrt{35}}{18} \cong \frac{5.9161}{18} \cong .329$

$\cos R = \frac{A}{H} = \frac{17}{18} \cong .944$

$\tan R = \frac{O}{A} = \frac{\sqrt{35}}{17} = \frac{5.9161}{17} \cong .348$

$\sin T = \frac{O}{H} = \frac{17}{18} = .944$

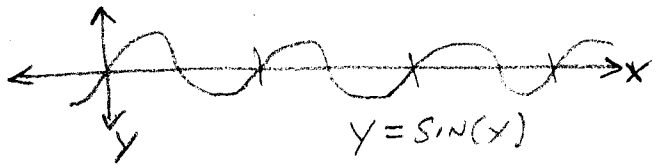
$\cos T = \frac{A}{H} = \frac{\sqrt{35}}{18} \cong .329$

$\tan T = \frac{O}{A} = \frac{17}{\sqrt{35}} = \frac{17}{5.9161} \cong 2.874$

THE SIN OF THE COMPLEMENTARY ANGLE OF R IS THE COSINE OF R, GET IT??

All scientific calculators have the sin, cos, and tan functions built-in! If you know an angle you can find the measure of a side, or use sides to find angles.

BTW:

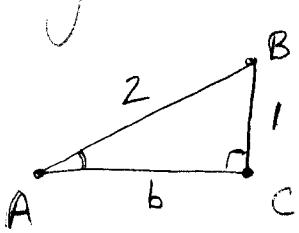


LATIN ⇒ SINUOUS "CURVY" OR "WAVY"

Using sides of Right Triangles To find Angles:

Which "trigonometric ratio" (SIN, COS, TAN) would you use to find the missing Angle?

trigonometry
- 3 "Study of Δ's"
- measures



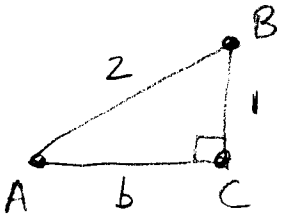
$m\angle A = ?$

$\sin A = \frac{1}{2} = \frac{O}{H}$

$\sin^{-1} .5 = 30°$

The Angle with a sin of $\frac{1}{2}$ is...

INVERSE SIN

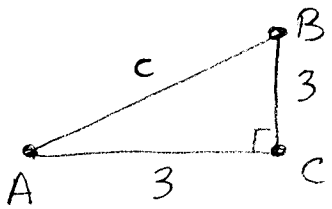


$m\angle B = ?$

$\cos B = \frac{1}{2} = \frac{a}{H}$

$\cos^{-1} .5 = 60°$

INVERSE COS



$m\angle A = ?$

$\tan A = \frac{3}{3} = \frac{O}{a}$

$\tan^{-1} 1 = 45°$

INVERSE TAN

SLOPE of A $= \frac{\text{rise}}{\text{run}}$

NOTE:

$\sin 30 = \frac{1}{2} = .5$

$\cos 30 = \frac{\sqrt{2^2 - 1^2}}{2} = \frac{\sqrt{3}}{2} = .866$

$\tan 30 = \frac{1}{\sqrt{3}} = .577$

$\sin 60 = \frac{\sqrt{3}}{2} = .866$

$\cos 60 = \frac{1}{2} = .5$

$\tan 60 = \frac{\sqrt{3}}{1} = 1.732$

Homework: ① Read Ch 11-7 Page 623-624 Study Ex 1-3

② Pg 627 #4-11

If you don't have a Scientific Calculator, use your Computer – Windows has one built-in. Or use this.