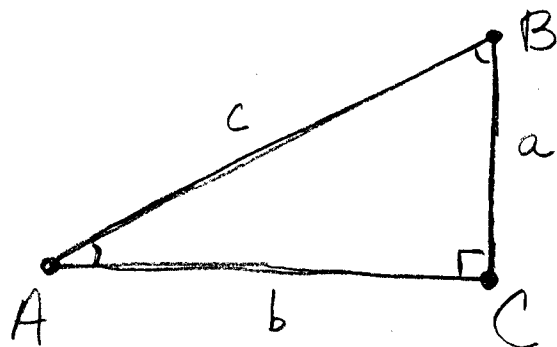


Alg I - BE COPY FOR NOTES: [3-28-11]

MORE "Right triangle" vocabulary:



A, B, C = angles

a, b, c = sides

⇒ side b is adjacent to $\angle A$
(next to) (Angle A)

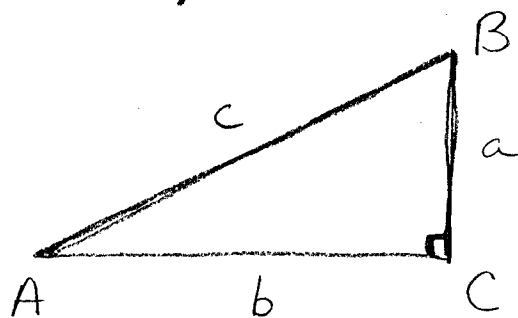
⇒ side a is opposite to $\angle A$
(Across from)

⇒ side a is adjacent to $\angle B$

⇒ side b is opposite to $\angle B$

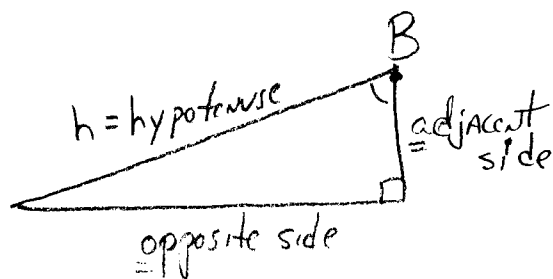
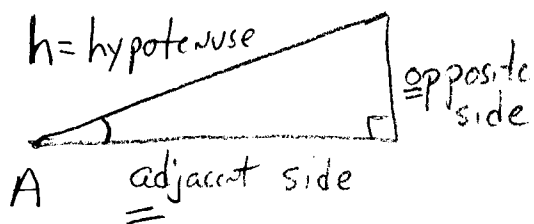
Only the angles A and B have sides that are referred to as adjacent. We never, for example, refer to side b as adjacent to $\angle C$. Also, we do not refer to side c as opposite $\angle C$, we refer to it by its name, the hypotenuse.

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

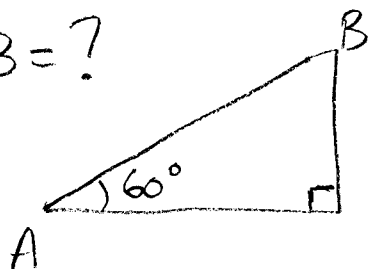


$\angle A$ and $\angle B$ are the two acute angles
(less than 90°)
in any right triangle.

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

(EX)

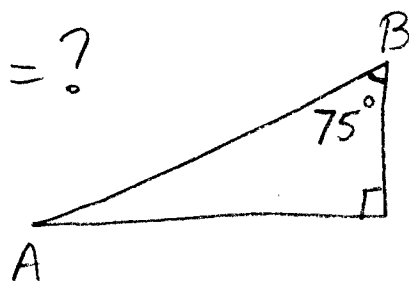
$B = ?$



$$m\angle B = 30^\circ$$

(EX)

$A = ?$

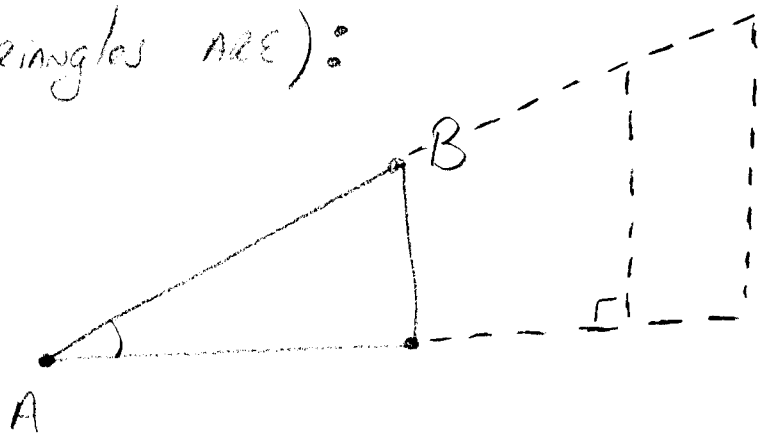


$$m\angle A = 15^\circ$$

A BASIC property of Right triangles:

For any right triangles that ARE SIMILAR (All angles equal)

The following RATIOS ARE ALWAYS THE SAME number (no matter how big or small the triangles are):



ALL RIGHT Δ WITH ∠A, ∠B ARE SIMILAR, SO THEY ALL IN THE SAME RATIOS!

For ∠A

$$\frac{\text{opposite}}{\text{hypotenuse}}$$

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

$$\frac{\text{opposite}}{\text{ADJACENT}}$$

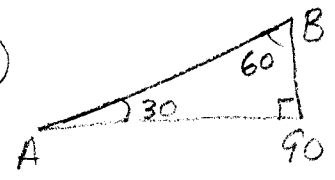
For ∠B

$$\frac{\text{opposite}}{\text{hypotenuse}}$$

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

$$\frac{\text{opposite}}{\text{ADJACENT}}$$

EX



For ∠A

$$\frac{o}{H} = 0.5$$

$$\frac{a}{H} \approx 0.866$$

$$\frac{o}{a} \approx 0.577$$

For ∠B

$$\frac{o}{H} \approx 0.866$$

$$\frac{a}{H} = 0.5$$

$$\frac{o}{a} \approx 1.732$$

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 scientific calculator has them "built in". These RATIOS have names.

$$\text{Sine of } \angle A \text{ or } \angle B = \frac{\text{opposite}}{\text{hypotenuse}}$$

ABBREVIATION

SIN

$$\text{Cosine of } \angle A \text{ or } \angle B = \frac{\text{adjacent}}{\text{hypotenuse}}$$

COS

$$\text{Tangent of } \angle A \text{ or } \angle B = \frac{\text{opposite}}{\text{adjacent}}$$

TAN

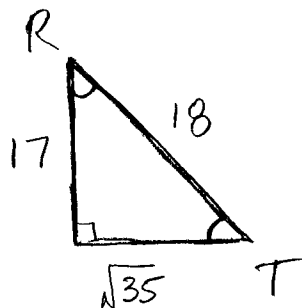
*M SOHCAHTOA

EX 1 Pg 624

⊙ EX Find the SINE, COSINE, AND TANGENT of LR and LT

$$\begin{aligned} \text{SINE} &= \sin = \frac{o}{h} \\ \text{COSINE} &= \cos = \frac{a}{h} \\ \text{TANGENT} &= \tan = \frac{o}{a} \end{aligned}$$

SOHCAHTOA



TO NEAREST
THOUSANDTH

$$\sin R = \frac{o}{h} = \frac{\sqrt{35}}{18} \approx \frac{5.9161}{18} \approx .329$$

$$\cos R = \frac{a}{h} = \frac{17}{18} \approx .944$$

$$\tan R = \frac{o}{a} = \frac{\sqrt{35}}{17} = \frac{5.9161}{17} \approx .348$$

$$\sin T = \frac{o}{h} = \frac{17}{18} = .944$$

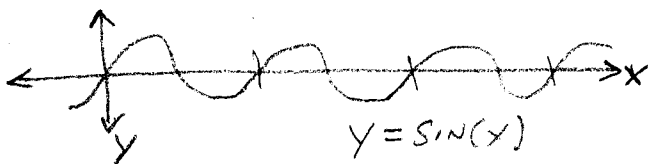
$$\cos T = \frac{a}{h} = \frac{\sqrt{35}}{18} \approx .329$$

$$\tan T = \frac{o}{a} = \frac{17}{\sqrt{35}} = \frac{17}{5.9161} \approx 2.874$$

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:

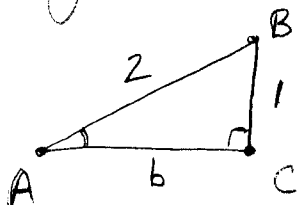


LATIN \Rightarrow SINUOUS
"CURVY" OR
"WAVY"

Using sides of Right Triangles to find Angles:

Which "trigonometric ratio" (sin, cos, tan) would
trigonometry
3 measures
"study of Δ 's"

you use to find the missing angle?



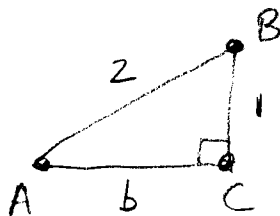
$m\angle A = ?$

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

↓

$\sin^{-1}.5 = 30^\circ$

↑ The angle with a sin of $\frac{1}{2}$ is...
INVERSE SIN

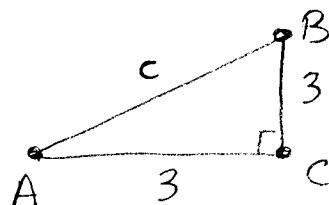


$m\angle B = ?$

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

$\cos^{-1}.5 = 60^\circ$

↑ INVERSE COS



$m\angle A = ?$

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

$\tan^{-1}1 = 45^\circ$

↓ * INVERSE TAN
SLOPE = $\frac{\text{rise}}{\text{run}}$
of A

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 ② Pg 627
Page 623-624 #4-11
STUDY EX 1-3

If you don't have a scientific calculator, use your computer - windows has one built-in or use web.