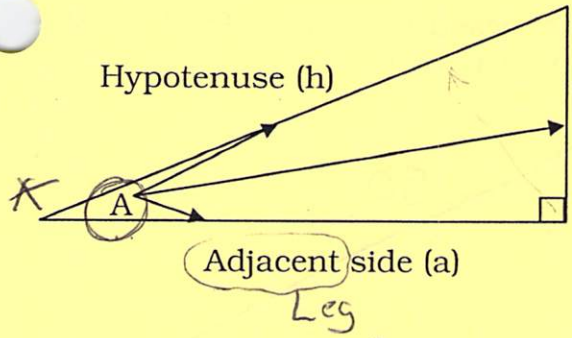
11-5a Trigonometric Ratios



Leg

Leg

A or θ - Angle

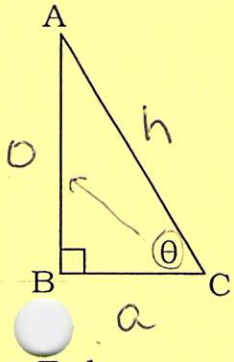
Other Things We Know About Right Triangles

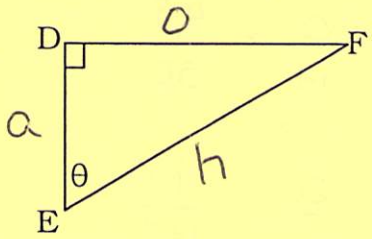
$a^2 + b^2 = c^2$

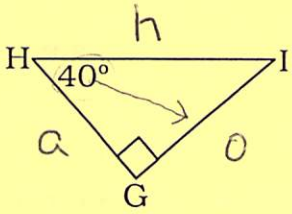
Angles inside add up to 180°

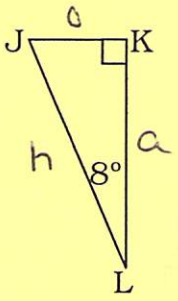
Hypotenuse: longest side

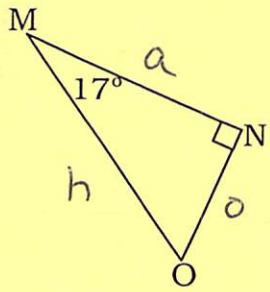
Label the hypotenuse (h), adjacent side (a) and opposite (o) given the marked reference angle *A* or θ.











Today we want to investigate the ratios between the pairs of sides of right triangles with angles of different sizes. We remember from Chapter 3 the vocabulary word **ratio**. Today we will use a ratio to

Compare the lengths of sides of rt. △'s

The cool thing is.... Over 2000 years ago the Babylonians observed the relationship between an angle and the sides of a right triangle. They began using these ratios frequently and gave them special names.

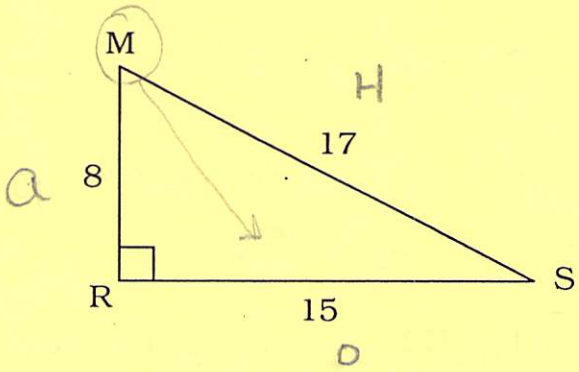
$$\underset{\text{angle}}{\text{Sin}}\ A = \frac{opposite}{hypotenuse} \qquad \underset{\text{angle}}{\text{Cos}}\ A = \frac{adjacent}{hypotenuse}$$

$$\underset{\text{angle}}{\text{tan}}\ A = \frac{opposite}{adjacent}$$

Most students have used the acronym SOH CAH TOA to remember these ratios. But you make up a saying for yourself!

Let's Try Some Practice!

Don't Forget to Label Your Triangle with H, O, and A



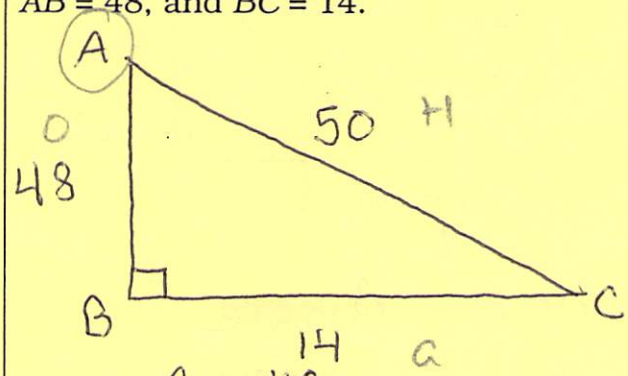
$\sin S = \frac{O}{H} = \frac{8}{17}$

$\tan S = \frac{O}{A} = \frac{8}{15}$

$\cos M = \frac{A}{H} = \frac{8}{17}$

$\sin M = \frac{O}{H} = \frac{15}{17}$

In ABC, the measure of $\angle B = 90°$, $AC = 50$, $AB = 48$, and $BC = 14$.



$\cos A = \frac{A}{H} = \frac{48}{50}$

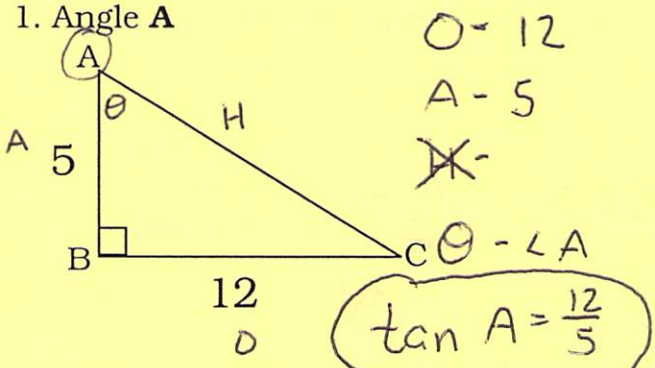
$\sin C = \frac{O}{H} = \frac{48}{50}$

$\tan A = \frac{O}{A} = \frac{14}{48}$

$\cos C = \frac{A}{H} = \frac{14}{50}$

Determine the Trig Ratio needed based on the information and reference angle given.

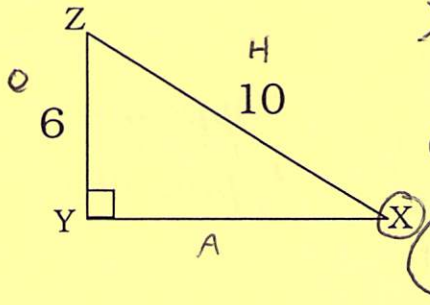
1. Angle **A**



O - 12
A - 5
~~H~~ -
θ - ∠A

$\tan A = \frac{12}{5}$

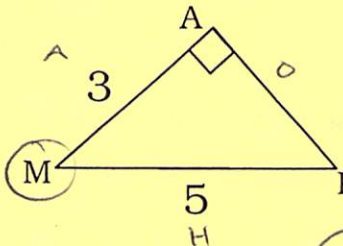
2. Angle **X**



O - 6
~~X~~ -
H - 10
θ - X

$\sin X = \frac{6}{10}$

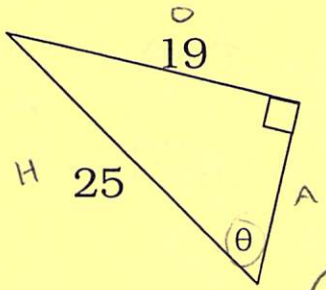
3. Angle **M**



~~θ~~ =
A = 3
H = ~~5~~
θ = ∠M

$\cos M = \frac{3}{5}$

4.



O = 19
~~A~~ =
H = 25
θ = θ

$\sin \theta = \frac{19}{25}$

Practice 11-5 Name _____

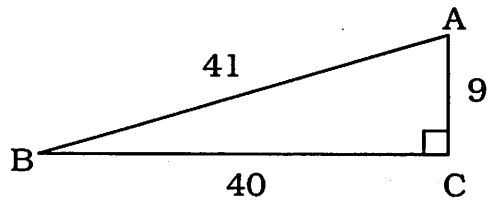
Write the acronym used for these trig functions.

Use ΔABC to find the trig ratio to represent each angle. [Example: tan A = $\frac{40}{9}$]

1. sin A =

2. cos A =

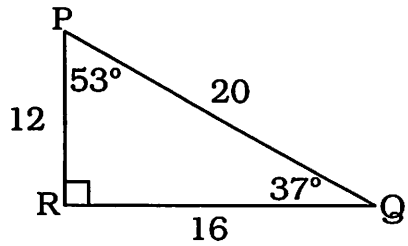
3. tan B =



4. sin B =

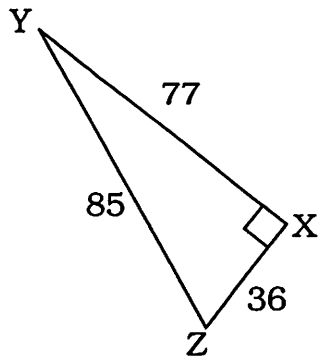
Notice we never find the *sin*, *cos*, and *tan* of the right angle!

5.



sin 37° = tan 37° = cos 53° = tan 53° =

Find the letter of the angle that completes the equation.



tan ___ = $\frac{36}{77}$ sin ___ = $\frac{77}{85}$ cos ___ = $\frac{77}{85}$ cos ___ = $\frac{36}{85}$