

Lesson 64 Objective: SWBAT use right triangle trigonometry to find missing angles and sides.

Kickoff- Put your weekly HW quiz on my desk and copy the following in your notes:

Triangle Properties:

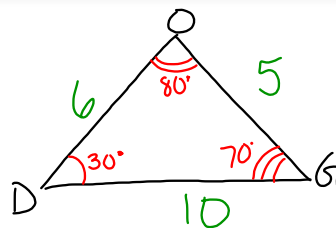
The properties below satisfy ALL triangles.

- 1) Angle will be labeled with Capital letters
- 2) Side will be labeled with lower case letters
 - i. Side "a" is across from Angle A
 - ii. Side "b" is across from Angle B
 - iii. Side "c" is across from Angle C

Example #1: Draw $\triangle DOG$. Label the sides and angles with the following information.

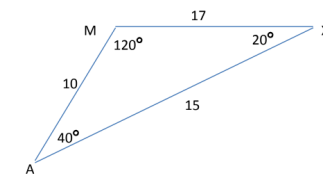
- $\angle D = 30^\circ$
 $\angle O = 80^\circ$
 $\angle G = 70^\circ$

- $d = 5$
 $o = 10$
 $g = 6$



Example #2: Given $\triangle MAX$ below. Determine the following values.

- $\angle M = 120^\circ$
 $\angle A = 40^\circ$
 $\angle X = 20^\circ$
 $m = 15$
 $a = 17$
 $x = 10$



Using SOH CAH TOA to Determine Trigonometric Ratios

Sine
 $\sin A = \frac{\text{Opposite}}{\text{Hypotenuse}}$

Cosine
 $\cos A = \frac{\text{Adjacent}}{\text{Hypotenuse}}$

Tangent
 $\tan A = \frac{\text{Opposite}}{\text{Adjacent}}$

SOH

CAH

TOA

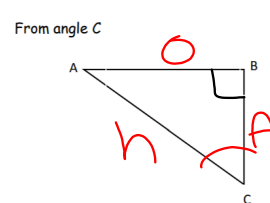
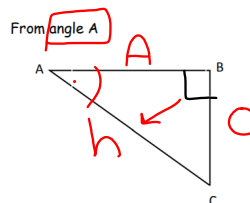
$$S = \frac{O}{H}$$

$$C = \frac{A}{H}$$

$$T = \frac{O}{A}$$

Opposite means across, and Adjacent means next to.

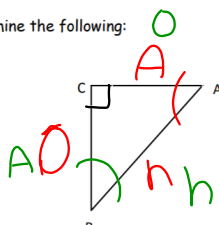
Practice Labeling with Opposite and Adjacent: Label the following triangles with opposite, adjacent, and hypotenuse FROM the given angle.



Example: Given the right triangle below, determine the following:

$\sin A = \frac{BC}{AB}$
 $\cos A = \frac{AC}{AB}$
 $\tan A = \frac{BC}{AC}$

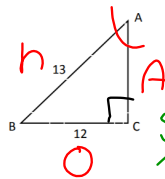
$\sin B = \frac{CA}{BA}$
 $\cos B = \frac{CB}{BA}$
 $\tan B = \frac{CA}{CB}$



Using Trigonometry to Determine a Missing Angle

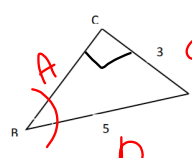
Examples: * must use inverses, \sin^{-1} , \cos^{-1} , \tan^{-1}

1) Using the right triangle below, determine the measure of angle A. Round your answer to the nearest tenth.



$S = \frac{O}{H}$
 $\sin A = \frac{12}{13}$
 $A = \sin^{-1}(12/13)$
 $A = 67.4^\circ$

2) Using the right triangle below, determine the measure of $\angle B$. Round your answer to the nearest hundredth.



Handwritten notes:

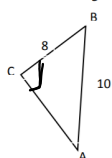
$$S = \frac{O}{H}$$

$$\sin B = \frac{3}{5}$$

$$\angle B = \sin^{-1}\left(\frac{3}{5}\right)$$

$$\angle B = 36.87^\circ$$

3) Using the right triangle below, determine the measure of $\angle CAB$. Round your answer to the nearest degree.



Handwritten notes:

$$\sin \angle CAB = \frac{8}{10}$$

$$\angle CAB = 53^\circ$$

In conclusion, when finding an angle of a right triangle you MUST

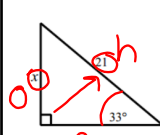
- Be in degree mode on the calculator
- Hit sin, cos, or tan

↑
inverses

Using Trigonometry to Determine a Missing Side

Examples:

1) Find the value of x to the nearest *tenth*.



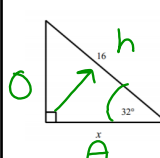
Handwritten notes:

$$\sin 33^\circ = \frac{x}{21}$$

$$x = 21 \sin 33^\circ$$

$$x = 11.4$$

2) Find the value of x to the nearest *hundredth*.



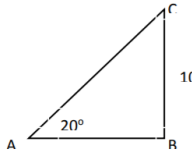
Handwritten notes:

$$\cos 32^\circ = \frac{x}{16}$$

$$x = 16 \cos 32^\circ$$

$$x = 13.57$$

3) Find the value of AB to the nearest *integer*.



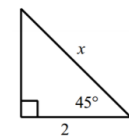
Handwritten notes:

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

$$\tan 20^\circ = \frac{10}{x}$$

$$x = \frac{10}{\tan 20^\circ} = 27$$

4) Find the value of x to the nearest *thousandth*.



Handwritten notes:

$$\cos 45^\circ = \frac{2}{x}$$

$$x = 2.828$$