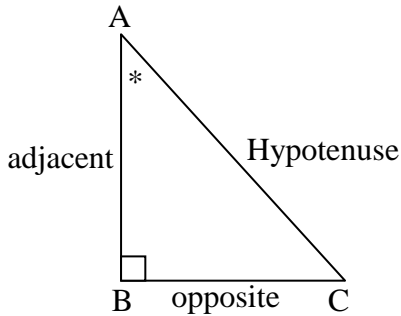


1.1 Lengths of Sides in Right Triangles

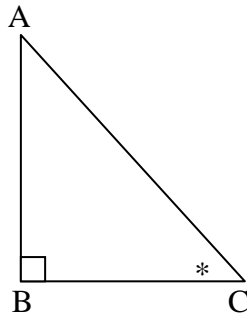
TRI GONO METRY
Three angle measurement

In any right angled triangle, there is a 90° angle and 2 acute angles.



$\angle B = 90^\circ \quad \therefore AC = \text{Hypotenuse}$

From $\angle A$, BC is _____
AB is _____



$\angle B = 90^\circ \quad \therefore AC = \text{Hypotenuse}$

From $\angle C$, AB is _____
BC is _____

Primary Trigonometric Ratios

Sine of $\angle A \longrightarrow \sin A = \frac{\text{opposite}}{\text{hypotenuse}} \longrightarrow \sin A = \frac{O}{H}$

Cosine of $\angle A \longrightarrow \cos A = \frac{\text{adjacent}}{\text{hypotenuse}} \longrightarrow \cos A = \frac{A}{H}$

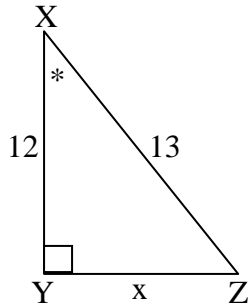
Tangent of $\angle A \longrightarrow \tan A = \frac{\text{opposite}}{\text{adjacent}} \longrightarrow \tan A = \frac{O}{A}$

The easiest way to MEMORIZE these ratios is to use:

SOH, CAH, TOA

Finding trig ratios:

Ex. What are the trig ratios of $\angle X$?



1. Find the missing side

$$\sin X = \frac{O}{H}$$

$$=$$

$$\cos X = \frac{A}{H}$$

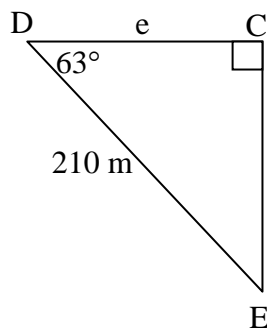
$$=$$

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

$$=$$

Using trig ratios to find missing measures in a triangle.

Ex. Find the length of $CD = e$.



1. Make a decision, using what you already know in the triangle and what you are trying to find.

From the 63° , we know the hypotenuse and we are looking for the adjacent.

$$\frac{A}{H} \rightarrow$$

1.2 Angles in Right Triangles

Finding Trig Values (usually to 4 decimal places)

Ex. $\cos 36^\circ =$

$\sin 52^\circ =$

$\tan 8^\circ =$

Finding Angles

Ex. $\cos A = 0.3584$

$\angle A =$

ex. $\sin A = 0.5736$

$\angle A =$

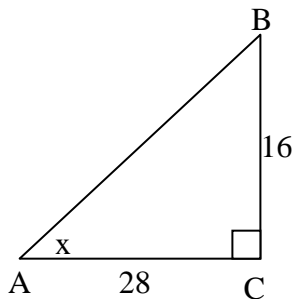
ex. $\tan A = 4.7046$

$\angle A =$

Angles are usually rounded to a given accuracy. If none is given, you can round to the nearest whole number.

Finding Angles in a Triangle

Ex. Determine the measure of $\angle A$ and $\angle B$.



1. Make a decision using what you know.

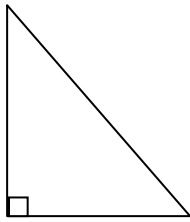
$$\frac{O}{A} \longrightarrow \tan A =$$

2. Make a decision using what you know.

$$\frac{O}{A} \longrightarrow \tan B =$$

Ex. Find the height of a building, if it casts a shadow that is 46 m long and the sun's rays strike the ground at an angle of 59° .

1. Draw and label a diagram of the given information.

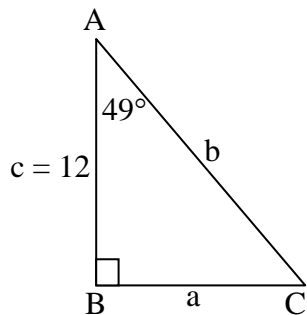


2. Make a decision based on what you know and what you want to find.



Solving a triangle \Rightarrow finding all missing measures in the triangle. This usually involves find 3 missing pieces of information. These could be angles or sides.

Ex. Solve $\triangle ABC$: $\angle A = 49^\circ$, $\angle B = 90^\circ$ and $c = 12$ m.



1. $\angle C = 180^\circ - 90^\circ - 49^\circ$
 $\angle C =$

2. To find a

$$\frac{O}{A} \longrightarrow \tan 49^\circ =$$

3. To find b

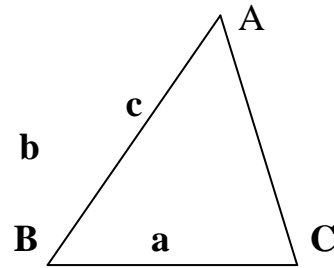


1.3 The Sine Law

The sine law can be used to solve for unknown angles and sides in a triangle that is **NOT** a right triangle. Using this method involves _____.

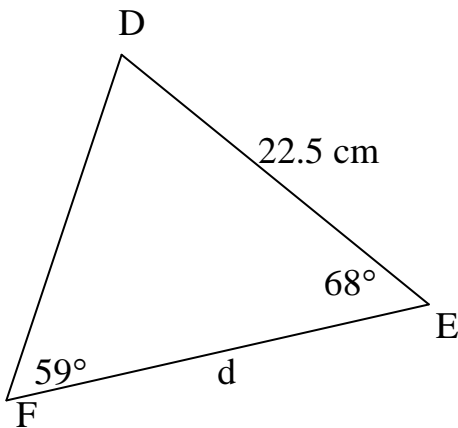
Notice that the side opposite the angle is labeled with a lower case letter (ie. a) and the angle is labeled with an upper case letter (ie. A).

One standard way to write the sine law is



EX. 1

Find the length of the indicated side, to 1 decimal place.



EX. 2

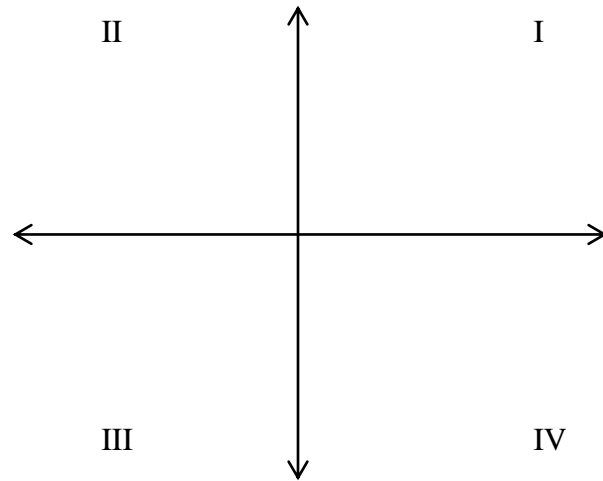
In $\triangle TIM$, $t = 8$ cm, $m = 5$ cm, and $\angle T = 40^\circ$. Find the measure of $\angle M$.

1.4 Trig ratios of Obtuse Angles

- On a Cartesian Plane, _____ angles are measured in Quadrant I.
- All angles in other quadrants are measured starting from Quadrant I, and are therefore greater than _____°.
- We will only look at angles measured in Quadrants I and II (acute and _____ angles!)

Ex.1.

- Locate 30° on the plane below
- Evaluate: $\sin 30^\circ =$
- Locate 150° on the plane below
- Evaluate: $\sin 150^\circ =$



In general, a positive sine ratio has _____ possible angles (the acute angle, and the supplementary angle).

Ex. 2. Evaluate the primary trigonometric ratios for 60° and its supplementary angle.

Ex. 3. Pg 43

#8b) $\cos A = \frac{4}{5}$ (for a positive ratio, cosine has only **one** possible angle between 0 and 180°)

#8d) $\sin A = 0.4770$ (for a positive ratio, sine has **two** possible angles between 0 and 180°)

$A =$ and $A =$

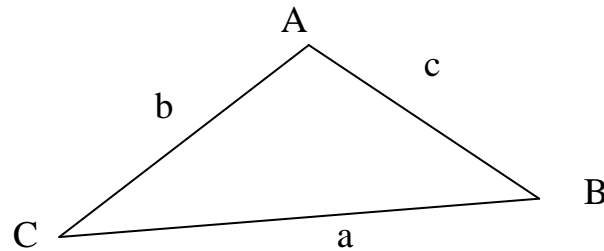
1.5 The Cosine Law

The cosine law says that for any $\triangle ABC$,

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$a^2 =$$

$$b^2 =$$

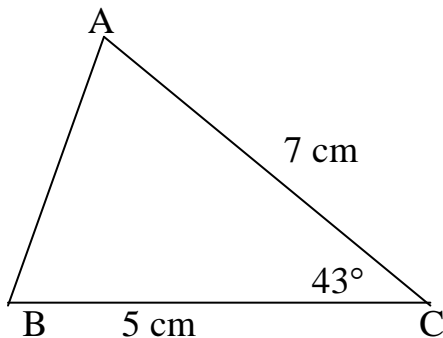


*** To use the cosine law you need to know at least _____.

*** If 2 sides of the triangle are known, **and** a _____, you can find the length of the third side.

*** If the length of the three sides of the triangle are known, you can find any unknown _____.

EX. 1 Find the value of side c .



EX. 2 Calculate $\angle A$ for $\triangle ABC$ if $a = 5$ cm, $b = 6$ cm, and $c = 7$ cm.