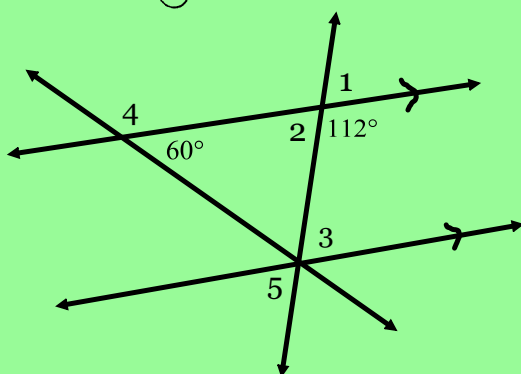
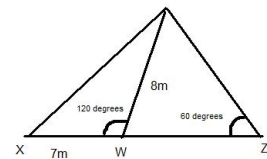


WARM UP


Find the measures of the indicated angles and be prepared to state your reasons.





TRIGONOMETRY



In this unit, we will:

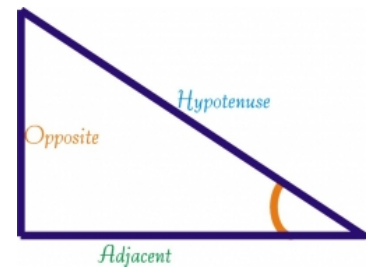
 Use the sine law to determine side lengths and angle measures in acute and obtuse triangles

 Use the cosine law to determine side lengths and angle measures in acute and obtuse triangles

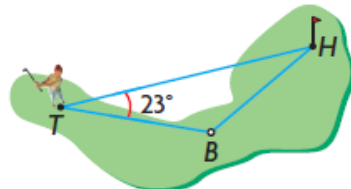
 Solve problems that can be modelled using acute and obtuse triangles



In **grade 10** math, we studied the primary trigonometric ratios and solved problems involving *right triangles*.



In **grade 11** math, we will explore oblique triangles, derive the *sine law* and *cosine law*, and examine the conditions that lead to the '*ambiguous case*'.



First though, let's have a quick review...

Important Vocabulary

Think
about it

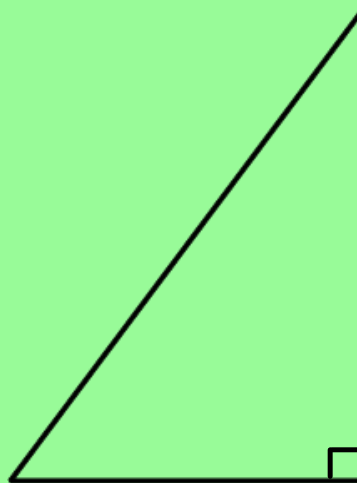
Hypotenuse

Adjacent

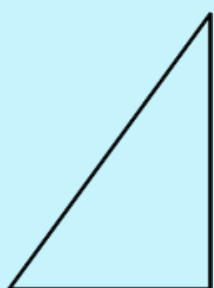
Opposite

- **beside, next to**
- **directly across from**
- **the side opposite the right angle**

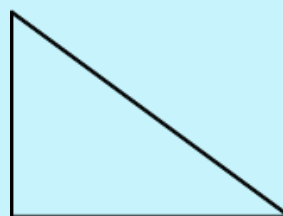
θ = theta (a letter in the greek alphabet)
It is used to represent an unknown angle.
Much like "x" is used in algebra.



Try These....



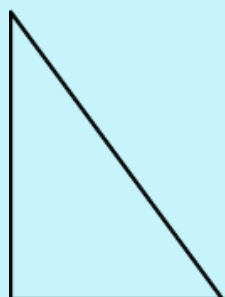
θ



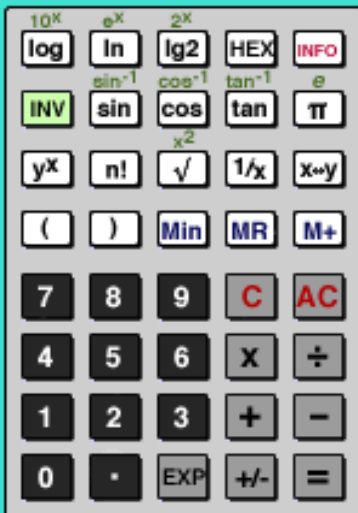
Opposite

Hypotenuse

Adjacent



Trig Ratios are comparisons of the lengths of sides in right triangles.



The Three Primary Trigonometric Ratios

$$\text{sine (sin)} = \frac{\text{opposite (O)}}{\text{hypotenuse(H)}}$$

$$\text{cosine(cos)} = \frac{\text{adjacent(A)}}{\text{hypotenuse(H)}}$$

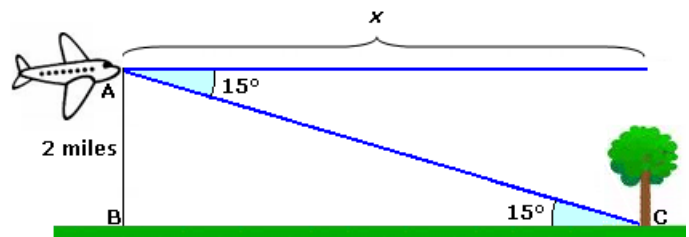
$$\text{tangent(tan)} = \frac{\text{opposite(O)}}{\text{adjacent(A)}}$$

Here is a way for some people to remember the three ratios;

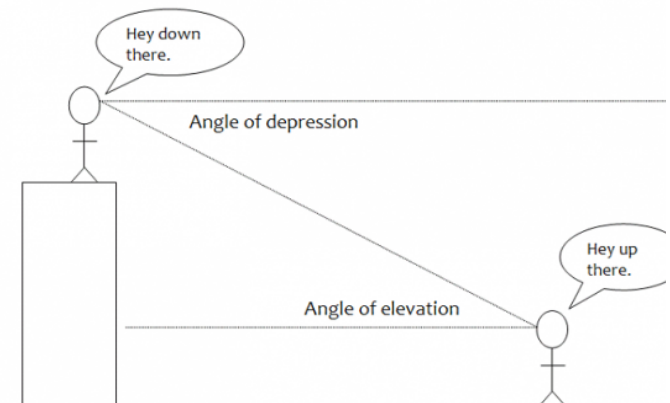
SOHCAHTOA

It is said sokatoa.

Angle of elevation – the angle in which your line of sight changes as you raise your eyes to see something above you.



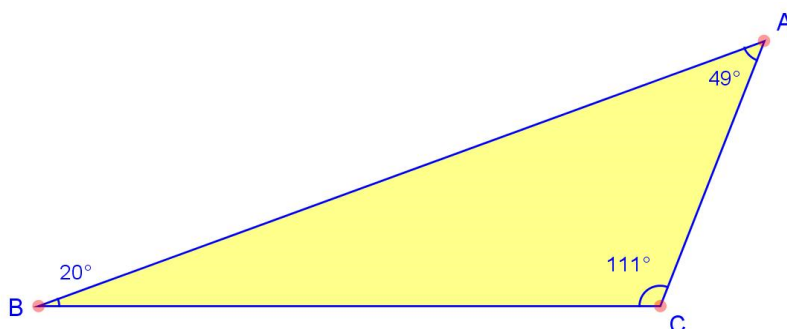
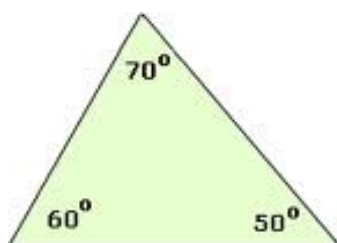
Angle of depression – the angle in which your line of sight changes as you lower your eyes to see something beneath you.



What do you notice about angles of elevation and depression?

An *oblique* triangle is any triangle that is not a right triangle.

It could be an *acute* triangle (all three angles of the triangle are less than 90 degrees) or it could be an *obtuse* triangle (one of the three angles is greater than 90 degrees).



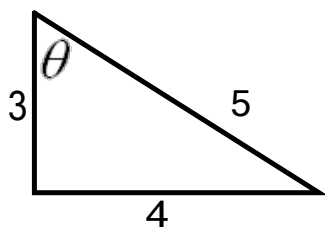
Solving oblique triangles:

The trigonometry of oblique triangles is not as simple of that of right triangles, but there are two theorems of geometry that give useful laws of trigonometry.

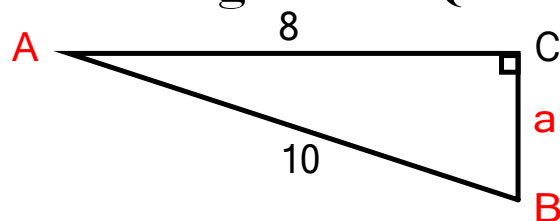
These are called the "[law of sines](#)" and the "[law of cosines](#)."

These two laws are all we need to solve oblique triangles!

Ex. 1: Find the primary trig ratios for this triangle, and then find θ .



Ex.2: Solve triangle ABC (all angles and sides)



1. We know 2 sides, so we can find the 3rd:

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



2. Then we can use what we know about trig to solve for angles A and B.

Use Trig to solve for side 'p' and side 'q'

