

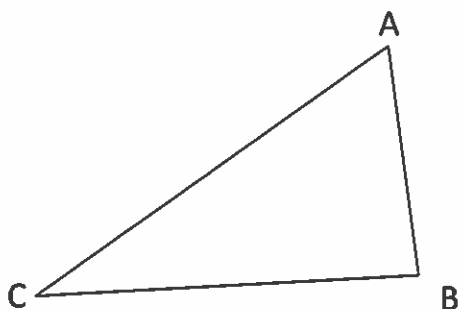
TRIGONOMETRY

Trigonometry is a branch of mathematics that studies properties of triangles and relationships between sides (lengths) and/or angles of those triangles.

REVIEW

- In every triangle constructed on a 2-dimensional plane (=flat surface) the three interior angles will add up to _____ .

Example: What is the degree measure of $\angle A$ if $\angle B = 84^\circ$ and $\angle C = 31^\circ$?



- A triangle can have at most one angle greater than _____. Such a triangle is called an obtuse triangle.
- A triangle that has all interior angles smaller than _____ is called an acute triangle.
- A triangle that has an angle of _____ is called a right-angled triangle, or a right triangle.
- A triangle that has at least two sides of the same size is called an _____ triangle. In such a triangle, at least two interior angles are also of the same size. A special case of such a triangle is a triangle that has all three sides of the same size.
- A triangle with all sides of the same size is called an _____ triangle. In this type of triangle, all three angles are the same and their degree measure is _____ .
- To show that sides are the same length, we cross the congruent (same) sides with a short stroke.
- To show that angles are the same, we give them the same symbol (a dot, cross, arc, ...).

Rules for Labeling Angles and Sides

Every angle has a tip that is called a vertex.

To label an angle we can do one of these three things:

1. Use Greek letters:

α

β

γ

δ

θ

2. Use a symbol \angle and a capital letter that is at the vertex:

3. Use a symbol \angle and three capital letters, where the middle letter is the vertex:
-

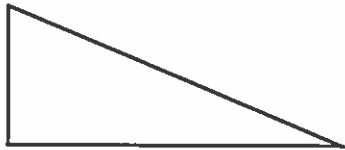
- Side lengths are line segments.
- Every side starts at a vertex of a triangle (corner) and goes to another vertex.
- Sides are labeled using **lower case letters**. The letter is the same as the name of the vertex opposite of the side.

Right-Angled Triangles

- Every right-angled triangle has its longest side across from the 90° angle.
- The longest side in the right-angled triangle is called the

_____ .

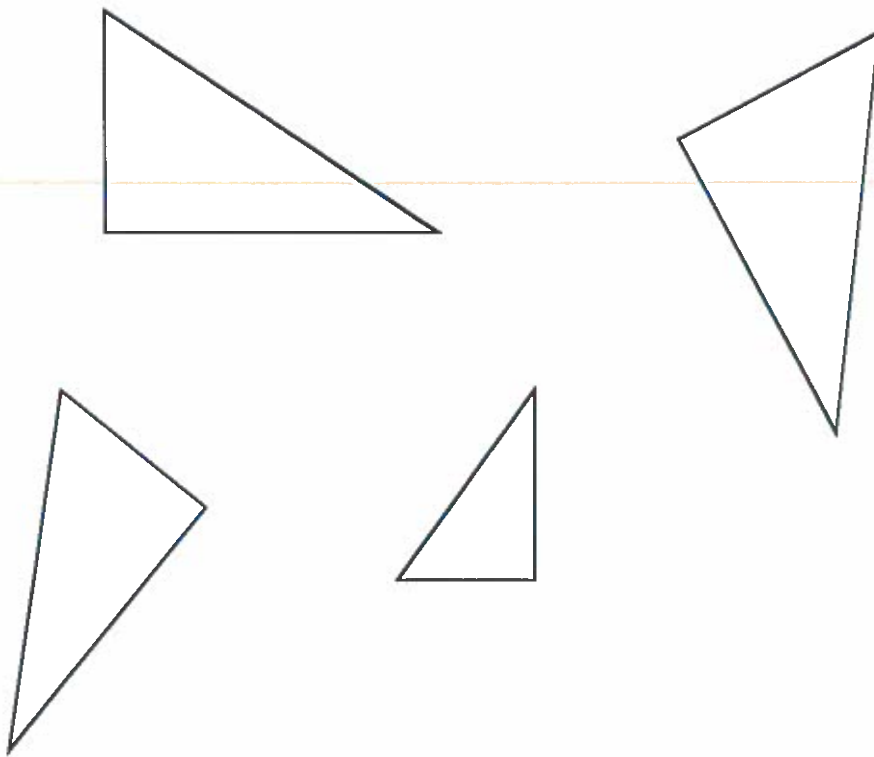
- The other two sides are called the _____ .
- A special symbol in a diagram is used to show that the interior angle is the right angle.



- In every right-angled triangle the following is true:

New labelling of right-angled triangles

- When working with a right-angled triangle in which one of the acute angles is labeled. We label the sides in relation to this angle.
- For the longest side we use **H = hypotenuse** (this is the only label that has not changed).
- For the side that does not touch the labeled acute angle we use **O = opposite**.
- For the side that forms the angle but is shorter than the hypotenuse we use **A = adjacent**.



- The relationship between the sides in a right-angled triangle goes beyond the Pythagorean Theorem.
- There are three specific ratios between two of the three sides. These ratios are called basic trigonometric ratios.

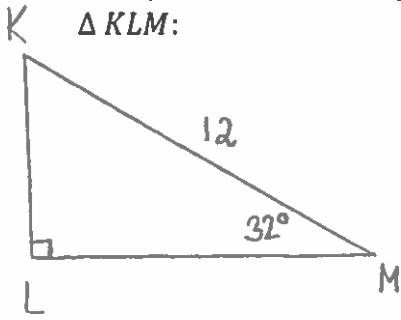
BASIC TRIGONOMETRIC RATIOS

Name			
Abbreviation			
Definition			
Diagram			
Formula			

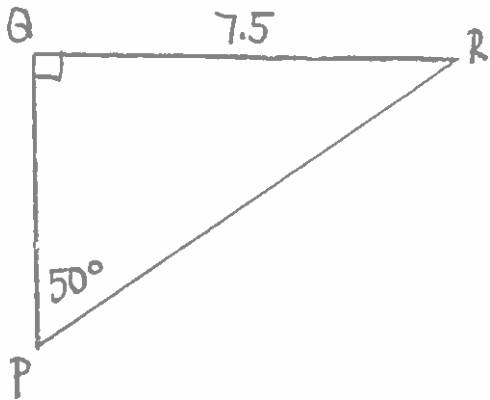
SOH – CAH – TOA

- The value of a trigonometric ratio does not have units. It is a number (a whole number, fraction or a decimal).
- Basic trigonometric ratios can be used to find the values for unknown side-lengths if one side and one acute angle in a right-angled triangle is known.
- **An inverse of a basic trigonometric ratio** can be used to find a degree measure of an unknown acute angle in a right-angled triangle when two sides are known.

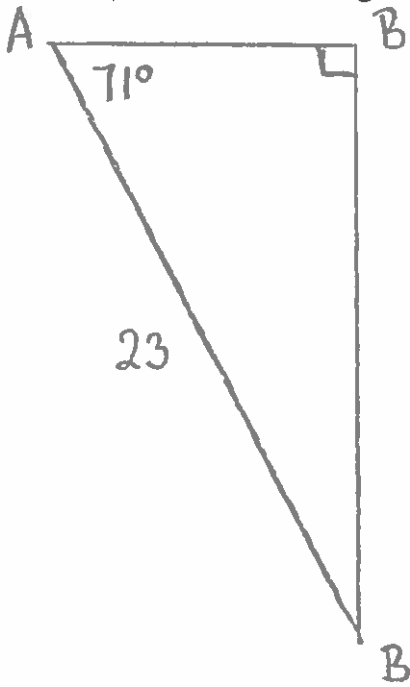
Example 1: Without using the Pythagorean Theorem, find the two unknown sides in the ΔKLM :



Example 2: Without using the Pythagorean Theorem, find the two unknown sides in the ΔPQR :



Example 3: Without using the Pythagorean Theorem, find the two unknown sides in the ΔABC :



Example 4: Without using the Pythagorean Theorem, find the two unknown sides in the ΔXYZ :

