###  Solving a triangles. Value of an expression

**ALGEBRA**

01

**Law of Cosines**

The problems that arise in topography and navigation require solving of triangles, that is, the

obtaining the unknown elements (sides and angles) from the known ones.

The solution of a triangle can be obtained by its geometric construction (with rule and

compass) or using trigonometric expressions (such as the sine and cosine theorems). These

problems can have a single solution, two solutions or they can be impossible to solve.

Next we will use the cosine theorem to solve a triangle.

This theorem is a generalization of the Pythagorean theorem. In French it is named after the mathematician

and Persian astronomer al-Kashi. Said theorem says:

Given a triangle $∆ABC$ of known sides $\overbar{BC}=a, \overbar{AC}=b, and \overbar{AB}=c$

* $a^{2}=b^{2}+c^{2}-2bc\sin(A\rightarrow A=cos^{-1}\left(\frac{a^{2}-b^{2}-c^{2}}{-2bc}\right))$
* $b^{2}=a^{2}+c^{2}-2ac\sin(B\rightarrow B=cos^{-1}\left(\frac{b^{2}-a^{2}-c^{2}}{-2ac}\right))$
* $c^{2}=a^{2}+b^{2}-2ab\sin(C\rightarrow C=cos^{-1}\left(\frac{c^{2}-a^{2}-b^{2}}{-2ab}\right))$

*b*

*a*

*A*

*c*

*B*

 Solve triangle$ ∆ABC$, given *a* = 15 , *b* = 34 y *c* = 35.

**1**

Solve triangle $∆ABC$, given *b* = 4 , *c* = 3 y *Â* = 60o.

**2**

 Solve triangle $∆ABC$, given *a* = 3 , *c* = 4 y *Â* = 30o.

**3**

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