

Law of Cosines

The **Law of Cosines** is used to solve two types of triangles:

- SSS - three sides given
- SAS - two sides and the angle in between

Definition

$$a^2 = b^2 + c^2 - 2bc \cos A$$

or

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

Notes

Example

Consider a triangle with sides $a=8$, $b=19$, and $c=14$.

- Always find the largest angle first. That would be B .

$$\cos B = \frac{8^2 + 14^2 - 19^2}{2(8)(14)} = -0.45089$$

- $B = 116.8^\circ$
- Now use the Law of Cosines again to find the other angles, or use the Law of Sines.
- $A = 22.1$, $C = 41.1$

Notes

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