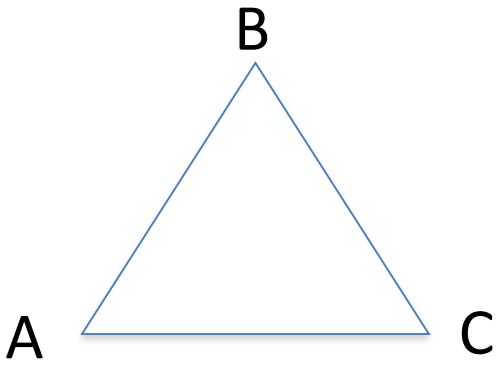
Sec. 6.2 Law of Cosines

When the given is SAS or SSS, we use the **Law of Cosines**.



In Δ ABC,

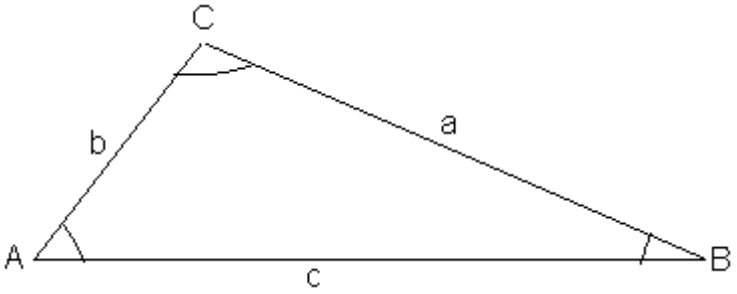
$c^2 = a^2 + b^2 - 2ab \cos C$

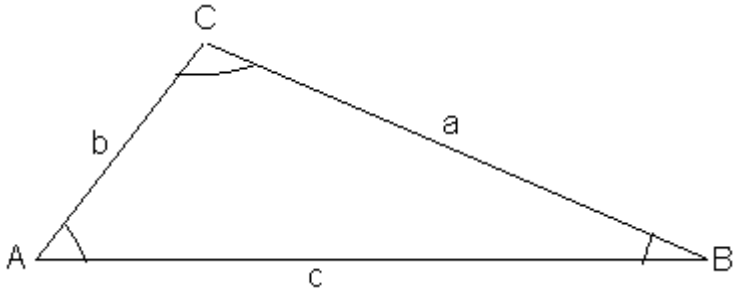
Ex.1) A Δ has sides 5 cm and 7 cm. The included angle is 115° Find the length of the 3rd side. (round to the nearest 10th)

Ex.2) A Δ has sides measuring 5, 7, and 10 cm. Find the measure of the 3 angles. (round to the nearest 10th)

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab} \qquad cosB = \frac{a^2 + c^2 - b^2}{2ac}$$

Altitude vs Median





Creates right angles (90°).

Solve with SOH CAH TOA and/or Pythagorean Theorem: $a^2 + b^2 = c^2$

Usually x ≠ y….but sometimes can, for example in an isosceles or equilateral triangle.

Splits the side its drawn to into 2 equal pieces.

x = y always.

The angles are usually not 90° …. but sometimes can be, for example in an isosceles or equilateral triangle.

Ex.3) A Δ has sides 6, 12, and 15 meters. Find the length of the median to the longest side. (round to the nearest 100^{th})

Heron's Area Formula for Area of a Triangle

*Use when you have SSS (NO angles)

$Area_{\Delta}=\sqrt{s(s-a)(s-b)(s-c)}$

Where $s=\frac{a+b+c}{2}$ (the semi-perimeter)

Ex4) Find the area of the triangle with sides 5 cm, 8 cm, and 10 cm. Round to the nearest 100^{th} (2 decimal places).

To decide which rules to use…

Law of Sines: AAS

ASA

SSA **(Ambiguous case: 0, 1, or 2 Δ's)**

Law of Cosines: SSS

SAS

Right Triangles: Use "SOH-CAH-TOA" and $a^2 + b^2 = c^2$