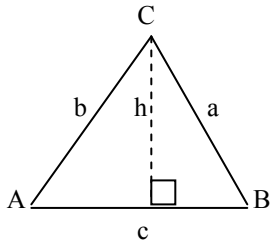


Law of Sines, Law of Cosines, and Area Formulas

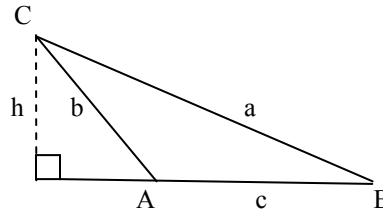
Law of Sines

If ABC is a triangle with sides, a , b , and c , then

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}.$$



A is acute



A is obtuse

The Law of Sines can be used when you know:

AAS

ASA

SSA

Law of Cosines

Standard Form

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

$$b^2 = a^2 + c^2 - 2ac \cos B$$

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

Alternative Form

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

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

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

The Law of Cosines can be used when you know:

SSS

SAS

Area Formulas

Area of an Oblique Triangle – used when you know two sides and their included angle

$$\text{Area} = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B$$

Heron's Area Formula – used when you know the lengths of all three sides

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

Where $s = \frac{a+b+c}{2}$ (this is half the perimeter)