List of physical constants

Constant	Symbol	Value
Speed of light in vacuum	c	2.99792458×10^{8} m·s^{-1}
Planck's constant	h	$6.62606876 \times 10^{-34}$ Js
Reduced Planck's constant	$\hbar = h/2\pi$	$1.054571596 \times 10^{-34}$ Js
Rest mass of an electron	m	$9.10938188 \times 10^{-31}$ kg
Rest mass energy of an electron	mc^2	81.871041 fJ = 510.99888 keV
Elementary charge	e	$1.60217653 \times 10^{-19}$ C
Permiability of free space	$\mu_0 = 4\pi \times 10^{-7}$	1.2566371×10^{-6} Vs/(Am)
Permittivity of free space	$\epsilon_0 = 1/\mu_0 c^2$	$8.85418782 \times 10^{-12}$ As/(Vm)
Thomson scattering length	$r_0 = e^2/4\pi\epsilon_0 mc^2$	2.82×10^{-15} m
Fine structure constant	$\alpha = \mu_0 ce^2/2h$	1/137.03599976
Boltzmann's constant	k_B	$1.3806503 \times 10^{-23}$ JK^{-1}
Avogadro's number	N_A	$6.02214199 \times 10^{23}$ mol^{-1}
Absolute zero	θ_0	-273.15 ^{o} C
Gas constant	$R = kN_A$	8.314472 JK^{-1} mol^{-1}
Normal pressure	p_n	101 325 Pa
Classical electron radius	r_0	2.8179×10^{-15} m

Cosine rule

By using the sine and cosine rules, one can determine the length of a side or an angle of a triangle with sides a, b, and c; and opposing angles A, B, and C, respectively (Figure 1). The cosine rule states that the length of each side can be written as

$a^2 = b^2 + c^2 - 2bc\cos A$
$b^2 = c^2 + a^2 - 2ca\cos B$
$c^2 = a^2 + b^2 - 2ab\cos C$

Similarly, these expressions can be rearranged to find the angles, for example,

$\cos A = (b^2 + c^2 - a^2)/2bc.$
The sine rules states
$(\sin A)/A = (\sin B)/B = (\sin C)/C$
Which rule you use depends on the information available about the triangle.

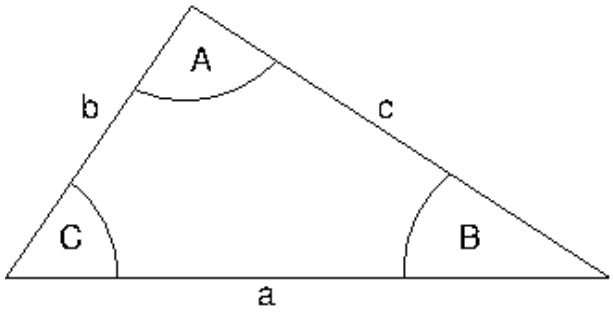

Figure 1: Cosine rule reference triangle.