

Constants, Formulae, and Conversion Factors

Symbol	Value
c	$2.997925 \times 10^8 \text{ m/s}$ $2.997925 \times 10^{10} \text{ cm/s}$
h	$6.6261 \times 10^{-34} \text{ J s}$ $6.6261 \times 10^{-27} \text{ erg s}$
k	$1.3807 \times 10^{-23} \text{ J/K}$ $1.3807 \times 10^{-16} \text{ erg/K}$
G	$6.67 \times 10^{-11} \text{ m}^3/(\text{kg s}^2)$ $6.67 \times 10^{-8} \text{ cm}^3/(\text{g s}^2)$
m_p	$1.6726 \times 10^{-27} \text{ kg}$ $1.6726 \times 10^{-24} \text{ g}$
m_n	$1.6748 \times 10^{-27} \text{ kg}$ $1.6748 \times 10^{-24} \text{ g}$
m_e	$9.1091 \times 10^{-31} \text{ kg}$ $9.1091 \times 10^{-28} \text{ g}$
σ	$5.6693 \times 10^{-8} \text{ J}/(\text{m}^2 \text{ s K}^4)$ $5.6693 \times 10^{-5} \text{ erg}/(\text{cm}^2 \text{ s K}^4)$ $5.6693 \times 10^{-1} \text{ erg}/(\text{m}^2 \text{ s K}^4)$

Symbol	Value
M_\odot	$1.989 \times 10^{30} \text{ kg}$ $1.989 \times 10^{33} \text{ g}$
R_\odot	$6.96 \times 10^8 \text{ m}$ $6.96 \times 10^{10} \text{ cm}$
L_\odot	$3.90 \times 10^{26} \text{ Watts}$ $3.90 \times 10^{33} \text{ erg/sec}$
T_\odot	5785 K
M_{Earth}	$5.974 \times 10^{24} \text{ kg}$ $5.974 \times 10^{27} \text{ g}$
M_{moon}	$7.348 \times 10^{22} \text{ kg}$ $7.348 \times 10^{25} \text{ g}$
A.U.	$1.496 \times 10^{11} \text{ m}$ $1.496 \times 10^{13} \text{ cm}$
$M_{Jupiter}$	$1.90 \times 10^{27} \text{ kg}$ $1.90 \times 10^{30} \text{ g}$
m_{He}	$3.97 m_p$

1 meter = 100 cm = 10^{-3} km = 1000 mm = 10^6 microns
1 light year = 9.4605×10^{15} meters
1 inch = 2.54 cm
1 mile = 1.609344 km
1 nanometer = 10^{-9} meters
1 Angstrom = 10^{-10} meters
1 parsec = 3.26 light years = 3.08×10^{18} cm
1 year = 365.244 days = 31,557,000 seconds
K = C + 273.15
F = 32 + 1.8 × C
1 g = 10^{-3} kg = 1000 mg
1 Joule = 0.2388 calories = 9.478×10^{-4} BTU = 10^7 ergs
1 Joule = 6.2415×10^{18} eV = 1 kg m ² /s ²
1 erg = 1 g cm ² /s ²
1 Watt = 1 J/s = 10^7 ergs/sec = 1.341×10^{-3} horsepower
2π radians = 360°
1 radian = 206265"
1° = 3600"
$D = \frac{\alpha d}{206265}$ for α in arcseconds

$F = ma$
$E = mc^2$
$P^2 = \left[\frac{4\pi^2}{G(M+m)} \right] a^3$
$\lambda_{max} (cm) = \frac{0.290}{T(K)}$
$F = \sigma T^4$
$c = \lambda\nu$
$L = A \times F = 4\pi d^2 b$
$L = 4\pi R^2 \sigma T^4$
$t \propto M^{-2.5}$
$E = h\nu$
$A = 4\pi R^2$
$d [\text{pc}] = 1/p [\text{arcsec}]$
$KE = \frac{1}{2}mv^2$
$PE = -GMm/R$
$v_{circ} = \sqrt{GM/R}$
$v_{esc} = \sqrt{2GM/R}$
$R_S = 2GM/c^2$
$\Theta_{rad} = \frac{\text{diameter}}{\text{distance}}$
$z = (\lambda - \lambda_0)/\lambda_0 = v/c$

$v = H_0 d$	$1 + z = \lambda_2/\lambda_1 = D(t_2)/D(t_1)$
$\rho_c = 3H_0^2/8\pi G$	$\Omega_0 = \Omega_m + \Omega_{rad} + \Omega_\Lambda$
$\Omega_0 = \rho_0/\rho_c$	$t_0 = f/H_0$