Data Sheet

Universal constants:

Avogadro constant	N_A	=	$6.022 \times 10^{23}\,\mathrm{mol}^{-1}$		
Boltzmann constant	k_B	=	$1.381 \times 10^{-23}\,\mathrm{J\,K}^{-1}$		
Charge of electron	e	=	$1.602 \times 10^{-19}\,\mathrm{C}$		
Planck constant	h	=	$6.626 \times 10^{-34}\,\mathrm{J\,s}$		
Speed of light in vacuum	c	=	$2.998 \times 10^{8}\,\mathrm{m\,s}^{-1}$		
Universal gravitational constant	G	=	$6.674 \times 10^{-11}\,\mathrm{N\,m}^2\,\mathrm{kg}^{-2}$		
Universal gas constant	R	=	$8.315\,\mathrm{J\,mol}^{-1}\,\mathrm{K}^{-1}$		
Stefan-Boltzmann constant	σ	=	$5.670 \times 10^{-8}\,\mathrm{W\,m}^{-2}\,\mathrm{K}^{-4}$		
Wien's displacement constant	b	=	$2.898 \times 10^{-3}\,\mathrm{m\,K}$		
Permittivity of free space	ϵ_0	=	$8.854 \times 10^{-12}\,\mathrm{m}^{-3}\,\mathrm{kg}^{-1}\,\mathrm{s}^4\,\mathrm{A}^2$		
Permeability of free space	μ_0	=	$1.257 \times 10^{-6}\,\mathrm{N\,A}^{-2}$		
Mass of electron	m_e	=	$9.109 \times 10^{-31}\,\mathrm{kg}$	=	$0.511\ \mathrm{MeV/c}^2$
Mass of proton	m_p	=	$1.673 \times 10^{-27}\,\mathrm{kg}$	=	$938.272\ \mathrm{MeV/c}^2$
Mass of neutron	m_n	=	$1.675 \times 10^{-27}\,\mathrm{kg}$	=	$939.565\ \mathrm{MeV/c}^2$
Mass of deuteron	m_D	=	$3.344 \times 10^{-27}\,\mathrm{kg}$	=	$1875.613\ \mathrm{MeV/c}^2$
Mass of He nucleus	m_{He}	=	$6.645 \times 10^{-27}\,\mathrm{kg}$	=	$3727.181\,\mathrm{MeV/c}^2$

Astronomical data:

Mass of Sun	$M_\odot$	=	$1.988 \times 10^{30}\,\mathrm{kg}$		
Radius of Sun	$R_\odot$	=	$6.957 \times 10^{8}\,\mathrm{m}$		
Luminosity of Sun	$L_\odot$	=	$3.828 \times 10^{26}\,\mathrm{W}$		
Effective temperature of Sun	$T_{\mathrm{eff},\odot}$	=	$5772\,\mathrm{K}$		
Apparent magnitude of Sun (in V-band)	$m_{\mathrm{V},\odot}$	=	-26.74		
Absolute magnitude of Sun (in V-band)	$M_{\mathrm{V},\odot}$	=	$+4.82$		
Apparent bolometric magnitude of Sun	$m_{\mathrm{bol},\odot}$	=	-26.83		
Absolute bolometric magnitude of Sun	$M_{\mathrm{bol},\odot}$	=	$+4.74$		
Solar constant (above atmosphere of Earth)	$S_\odot$	=	$1361\,\mathrm{W\,m}^{-2}$		
Apparent angular diameter of Sun (from Earth)	$\theta_\odot$	≈	$32'$		
Mass of Earth	$M_\oplus$	=	$5.972 \times 10^{24}\,\mathrm{kg}$		
Radius of Earth	$R_\oplus$	=	$6.378 \times 10^{6}\,\mathrm{m}$		
Axial tilt of Earth	ϵ	=	$23°26'$		
Inclination of the lunar orbit w.r.t. the ecliptic		=	$5°8'43''$		
Mass of Jupiter	M_J	=	$1.898 \times 10^{27}\,\mathrm{kg}$		
Radius of Jupiter	R_J	=	$6.991 \times 10^{7}\,\mathrm{m}$		
1 Astronomical Unit	$1\,\mathrm{au}$	=	$1.496 \times 10^{11}\,\mathrm{m}$		
1 parsec	$1\,\mathrm{pc}$	=	$3.086 \times 10^{16}\,\mathrm{m}$		
1 light-year	$1\,\mathrm{ly}$	=	$9.461 \times 10^{15}\,\mathrm{m}$		
1 jansky	$1\,\mathrm{Jy}$	=	$10^{-26}\,\mathrm{W\,m}^{-2}\,\mathrm{Hz}^{-1}$		
1 tropical year		=	365.2422 solar days	=	$3.156 \times 10^{7}\,\mathrm{s}$
		=	365 d 5 h 48 min 46 s		
1 sidereal year		=	365.2564 solar days	=	$3.156 \times 10^{7}\,\mathrm{s}$
		=	365 d 6 h 9 min 13 s		
Rate of precession of Vernal Equinox		=	$1°$ per 71.6 years		

Calculus related formulas:

1. $\dfrac{dy}{dx} = \dfrac{dy}{du}\dfrac{du}{dx}$
2. $\dfrac{d}{dx}x^n = nx^{n-1}$
3. $\dfrac{d}{dx}\sin kx = k\cos kx$
4. $\dfrac{d}{dx}\cos kx = -k\sin kx$
5. $\dfrac{d}{dx}\tan kx = k\sec^2 kx$
6. $\displaystyle\int x^n\,dx = \frac{x^{n+1}}{n+1} + \text{constant; for } n \neq -1$
7. $f(x) \simeq f(x_0) + \left.\dfrac{df}{dx}\right|_{x=x_0}(x - x_0);\ \text{for } x \approx x_0$