

9.2 Solar system data

Solar data

equatorial radius	$R_{\odot}$	=	$6.960 \times 10^8 \text{ m}$	=	$109.1 R_{\oplus}$
mass	$M_{\odot}$	=	$1.9891 \times 10^{30} \text{ kg}$	=	$3.32946 \times 10^5 M_{\oplus}$
polar moment of inertia	$I_{\odot}$	=	$5.7 \times 10^{46} \text{ kg m}^2$	=	$7.09 \times 10^8 I_{\oplus}$
bolometric luminosity	$L_{\odot}$	=	$3.826 \times 10^{26} \text{ W}$		
effective surface temperature	$T_{\odot}$	=	5770 K		
solar constant ^a			$1.368 \times 10^3 \text{ W m}^{-2}$		
absolute magnitude	M_V	=	+4.83;	M_{bol}	= +4.75
apparent magnitude	m_V	=	-26.74;	m_{bol}	= -26.82

^aBolometric flux at a distance of 1 astronomical unit (AU).

Earth data

equatorial radius	$R_{\oplus}$	=	$6.37814 \times 10^6 \text{ m}$	=	$9.166 \times 10^{-3} R_{\odot}$
flattening ^a	f	=	0.00335364	=	1/298.183
mass	$M_{\oplus}$	=	$5.9742 \times 10^{24} \text{ kg}$	=	$3.0035 \times 10^{-6} M_{\odot}$
polar moment of inertia	$I_{\oplus}$	=	$8.037 \times 10^{37} \text{ kg m}^2$	=	$1.41 \times 10^{-9} I_{\odot}$
orbital semi-major axis ^b	1 AU	=	$1.495979 \times 10^{11} \text{ m}$	=	$214.9 R_{\odot}$
mean orbital velocity			$2.979 \times 10^4 \text{ ms}^{-1}$		
equatorial surface gravity	g_e	=	9.780327 ms^{-2}	(includes rotation)	
polar surface gravity	g_p	=	9.832186 ms^{-2}		
rotational angular velocity	ω_e	=	$7.292115 \times 10^{-5} \text{ rad s}^{-1}$		

^a f equals $(R_{\oplus} - R_{\text{polar}})/R_{\oplus}$. The mean radius of the Earth is $6.3710 \times 10^6 \text{ m}$.

^bAbout the Sun.

Moon data

equatorial radius	R_m	=	$1.7374 \times 10^6 \text{ m}$	=	$0.27240 R_{\oplus}$
mass	M_m	=	$7.3483 \times 10^{22} \text{ kg}$	=	$1.230 \times 10^{-2} M_{\oplus}$
mean orbital radius ^a	a_m	=	$3.84400 \times 10^8 \text{ m}$	=	$60.27 R_{\oplus}$
mean orbital velocity			$1.03 \times 10^3 \text{ ms}^{-1}$		
orbital period (sidereal)			27.32166 d		
equatorial surface gravity			1.62 ms^{-2}	=	$0.166 g_e$

^aAbout the Earth.

Planetary data^a

	$M/M_{\oplus}$	$R/R_{\oplus}$	$T(\text{d})$	$P(\text{yr})$	$a(\text{AU})$	M	mass
Mercury	0.055 274	0.382 51	58.646	0.240 85	0.387 10	R	equatorial radius
Venus ^b	0.815 00	0.948 83	243.018	0.615 228	0.723 35	T	rotational period
Earth	1	1	0.997 27	1.000 04	1.000 00	P	orbital period
Mars	0.107 45	0.532 60	1.025 96	1.880 93	1.523 71	a	mean distance
Jupiter	317.85	11.209	0.413 54	11.861 3	5.202 53	$M_{\oplus}$	$5.9742 \times 10^{24} \text{ kg}$
Saturn	95.159	9.449 1	0.444 01	29.628 2	9.575 60	$R_{\oplus}$	$6.37814 \times 10^6 \text{ m}$
Uranus ^b	14.500	4.007 3	0.718 33	84.746 6	19.293 4	1 d	86400 s
Neptune	17.204	3.882 6	0.671 25	166.344	30.245 9	1 yr	$3.15569 \times 10^7 \text{ s}$
Pluto ^b	0.002 51	0.187 36	6.387 2	248.348	39.509 0	1 AU	$1.495979 \times 10^{11} \text{ m}$

^aUsing the osculating orbital elements for 1998. Note that P is the instantaneous orbital period, calculated from the planet's daily motion. The radii of gas giants are taken at 1 atmosphere pressure.

^bRetrograde rotation.

