Relationships and data;

$$\frac{\theta}{360} = \frac{s}{2\pi R}$$

$$P^2 = a^3 \quad \text{(P in years, a in AU)}$$

$$P^2 = \frac{4\pi a^3}{G(m_1 + m_2)} \quad \text{(all in SI units)}$$

$$e = \frac{dist\,between\,foci}{2a}$$

$$e = \sqrt{1 - \frac{b^2}{a^2}}$$

$$F = G\frac{m_1 m_2}{r_{12}^{\ 2}}$$

F=ma

$$v_{circ} = \sqrt{\frac{GM}{r}}$$

$$v_{escape} = \sqrt{\frac{2GM}{r}}$$

frequency=1/Period

$$frequency = f = \frac{c}{\lambda}$$

Wien's law: $\lambda_{Imax} = \left(\frac{3\times10^6}{T_{Kelvin}}\right) nm$

Stefan's Law: $Flux = \sigma T_K^{\ 4}$

Power = (Flux) x (area emitting)

$$T_{kelvin} = T_{celsius} + 273$$

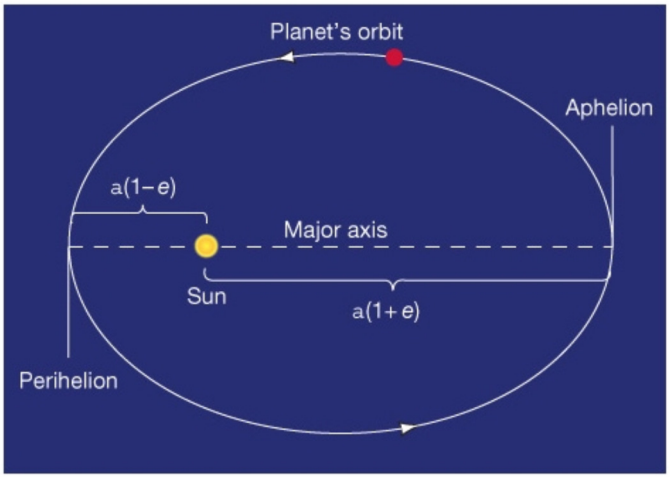
$$E_{photon} = hf$$

$$\frac{\lambda'}{\lambda} = \frac{f}{f'} = (1 + \frac{v}{c})$$

$$\theta_{resolvable,radians} = \frac{\lambda}{D}$$

$$Intensity = \frac{Power}{4\pi R^2}$$

$$Density = \frac{mass}{volume}$$



$$\sigma = 5.67\times10^{-8}\,\frac{W}{m^2K^4}$$

$$G = 6.67\times10^{-11}\,\frac{Nm^2}{kg^2}$$

$$h = 6.34\times10^{-34}\,Js$$

$$c = 3.00\times10^{8}\,\frac{m}{s}$$

1 degree = 60 arc minutes
1 arc minute = 60 arc sec
360 degrees= 2π radians
1 a.u. = 150x10^6 km
1 light-year=distance light travels in 1 year
Area of circle: $A = \pi R^2$
Area of sphere: $A = 4\pi R^2$
Volume of sphere: $V = \frac{4}{3}\pi R^3$

Prefix	Symbol	Meaning	Prefix	Symbol	Meaning
deci	d	10^{-1}	deka	da	10^{1}
centi	**c**	$\mathbf{10^{-2}}$	hecto	h	10^{2}
milli	**m**	$\mathbf{10^{-3}}$	**kilo**	**k**	$\mathbf{10^{3}}$
micro	**μ**	$\mathbf{10^{-6}}$	**mega**	**M**	$\mathbf{10^{6}}$
nano	n	10^{-9}	**giga**	**G**	$\mathbf{10^{9}}$
pico	p	10^{-12}	tera	T	10^{12}
femto	f	10^{-15}	peta	P	10^{15}
atto	a	10^{-18}	exa	E	10^{18}

Example: 1 nanometer = 10^{-9} meter OR 1nm = 10^{-9} m

Density of common solar system materials:

Iron	8000 kg/m^3	Water/Ice	1000 kg/m^3
Granite	2750 kg/m^3	Amonia (NH_3)	800 kg/m^3
CO_2 Ice	1600 kg/m^3	Methane (CH_4)	500 kg/m^3