# The Equation Page

## Constants

$G = 6.67 \times 10^{-11}\,\mathrm{Nm^2/kg^2}$
$\sigma = 5.67 \times 10^{-8}\,\mathrm{W/m^2/K^4}$
$c = 3 \times 10^{8}\,\mathrm{m/s}$
$H = 72\,\mathrm{km/(s\,Mpc)}$

$\odot =$ Pertaining to Sun
$M_\odot = 1.99 \times 10^{30}\,\mathrm{kg}$
$\mathcal{L}_\odot = 4 \times 10^{26}\,\mathrm{W}$
$R_\odot = 695{,}700\,\mathrm{km}$

$1\,\mathrm{pc} = 3.26\,\mathrm{lyrs}$
$\oplus =$ Pertaining to Earth
$M_\oplus = 5.97 \times 10^{24}\,\mathrm{kg}$
$R_\oplus = 6.37 \times 10^{6}\,\mathrm{m}$

## Math Equations

$$A_c = \pi r^2$$
$$A_e = \pi a b$$
$$C = 2\pi r$$
$$f = \sqrt{a^2 - b^2}$$
$$\varepsilon = \sqrt{1 - \frac{b^2}{a^2}}$$

## Math Descriptions

$A_c =$ area of circle
$A_e =$ area of ellipse
$a =$ semi-major axis
$b =$ semi-minor axis
$r =$ radius of circle
$C =$ circumference of circle
$f =$ foci of ellipse
$\varepsilon =$ eccentricity of ellipse

## Physics Equations

$$\lambda_{peak}(\mathrm{nm}) = \frac{2900000}{T}$$
$$\frac{a_r^3(\mathrm{AU})}{p^2(\mathrm{yrs})} = (M_1 + M_2)_\odot$$
$$F = Ma$$
$$F_g = G\frac{M_1 M_2}{a_r^2}$$
$$L = Mvr$$
$$\frac{v}{c} = \frac{\lambda_{obs} - \lambda_{rest}}{\lambda_{rest}}$$
$$\frac{\theta}{360} = \frac{r}{2\pi d}$$
$$\lambda f = c$$
$$f_{lost} = \frac{r_p^2}{r_s^2}$$
$$v = \frac{C}{p}$$
$$d(\mathrm{pc}) = \frac{1}{\phi('')}$$
$$\mathcal{L} = 4\pi r^2 \sigma T^4$$
$$\mathcal{L} = 4\pi d^2 B$$
$$m = -2.5 \log\left(\frac{B}{B_{Vega}}\right)$$
$$\frac{B_1}{B_2} = 10^{0.4(m_2 - m_1)}$$
$$R_s = \frac{2GM}{c^2}$$
$$E = Mc^2$$
$$v = Hd$$

## Physics Descriptions

$T =$ temperature
$\lambda =$ wavelength
$p =$ period
$a_r =$ avg distance between or semi-major axis
$F =$ force
$M =$ mass
$a =$ acceleration
$v =$ velocity
$L =$ angular momentum
$r =$ radius
$\theta =$ angular radius
$d =$ distance to object
$f =$ frequency
$f_{lost} =$ fraction light lost
$r_{p/s} =$ radius of planet/sun
$\phi =$ parallax angle
$\mathcal{L} =$ luminosity
$C =$ circumference
$m =$ magnitude
$B =$ brightness
$R_s =$ Schwarzchild Radius
$E =$ Energy

## SI Prefixes

| pico | nano | micro | milli | centi | Base | kilo | mega | giga | tera | peta |
|---|---|---|---|---|---|---|---|---|---|---|
| $10^{-12}$ | $10^{-9}$ | $10^{-6}$ | $10^{-3}$ | $10^{-2}$ | 1 | $10^{3}$ | $10^{6}$ | $10^{9}$ | $10^{12}$ | $10^{15}$ |