

Formula Sheet

411 Phys

Symbol / Value (with units)

$$h = 6.62607015 \times 10^{-34} \text{ J s}$$

$$c = 2.99792458 \times 10^8 \text{ m s}^{-1}$$

$$k = 1.380649 \times 10^{-23} \text{ J K}^{-1}$$

$$\sigma = 5.670374419 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$$

$$G = 6.67430 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$$

$$a = 7.5657 \times 10^{-16} \text{ J m}^{-3} \text{ K}^{-4}$$

$$b = 2.898 \times 10^{-3} \text{ m K}$$

$$1 \text{ eV} = 1.602176634 \times 10^{-19} \text{ J}$$

$$m_H = 1.673 \times 10^{-27} \text{ kg}$$

$$T_{\odot} = 5778 \text{ K}$$

$$R_{\odot} = 6.957 \times 10^8 \text{ m}$$

$$L_{\odot} = 3.83 \times 10^{26} \text{ W}$$

Formula

Notes / constants

$L = 4\pi R^2 \sigma T^4$	$\sigma \approx 5.670374419 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$
$F = \sigma T^4$	—
$\lambda_{\max} T = b$	$b \approx 2.898 \times 10^{-3} \text{ m K}$
$m_1 - m_2 = -2.5 \log_{10} \left(\frac{F_1}{F_2} \right)$	—
$F \propto \frac{1}{d^2} \quad \text{or} \quad F = \frac{L}{4\pi d^2}$	—
$\mu \equiv m - M = 5 \log_{10} \left(\frac{d}{10 \text{ pc}} \right)$	—
$E = \frac{hc}{\lambda} \quad \text{and} \quad E[\text{eV}] \approx \frac{1240}{\lambda[\text{nm}]}$	$h = 6.62607015 \times 10^{-34} \text{ J s},$ $c = 2.99792458 \times 10^8 \text{ m s}^{-1}$
$\frac{L_1}{L_2} = \left(\frac{R_1}{R_2} \right)^2 \left(\frac{T_1}{T_2} \right)^4$	—

Solar reference values (for checks): $T_{\odot} \approx 5778 \text{ K}$, $R_{\odot} \approx 6.957 \times 10^8 \text{ m}$, $L_{\odot} \approx 3.83 \times 10^{26} \text{ W}$
