

ASTR 130 Formulas & Constants

$k = \text{kilo} = 10^3$	$c = 3 \times 10^8 \text{ m/s}$	$1 \text{ ly} = 9.5 \times 10^{12} \text{ km}$
$M = \text{mega} = 10^6$	$h = 6.63 \times 10^{-34} \text{ Js or}$	$1 \text{ AU} = 1.5 \times 10^7 \text{ km}$
$n = \text{nano} = 10^{-9}$	$h = 4.15 \times 10^{-15} \text{ eVs}$	
$m = \text{milli} = 10^{-3}$	$\sigma = 5.65 \times 10^{-34} \text{ W/m}^2/\text{K}^4$	

Review from A129:

$\alpha = \frac{s}{d} 57.3^\circ$	$p^2 = a^3$	$v = \frac{\Delta x}{\Delta t}$	$a = \frac{\Delta v}{\Delta t}$	$\text{net } F = ma$	$p = mv$	$L = mvr$	$KE = \frac{1}{2}mv^2$
<i>small angle formulae</i>	<i>Kepler's 3rd law</i>	<i>velocity</i>	<i>acceleration</i>	<i>Newton's 2nd law</i>	<i>momentum</i>	<i>angular momentum</i>	<i>kinetic energy</i>
$E = mc^2$	$F = G \frac{M_1 M_2}{d^2}$	$a^3 = (M_1 + M_2) p^2$	$v_{\text{orbit}} = \sqrt{\frac{GM}{R}}$	$v_{\text{escape}} = \sqrt{\frac{2GM}{R}}$			
<i>mass energy</i>	<i>gravity</i>	<i>Newton's form Kepler's 3rd</i>	<i>orbital velocity</i>	<i>escape velocity</i>			

Now A130:

$P = \frac{E}{\Delta t}$	$c = \lambda f$	$E = hf = \frac{hc}{\lambda}$	$F = \sigma T^4$	$\lambda_{\text{max}} = \frac{2.9 \times 10^6 \text{ nm} \cdot \text{K}}{T}$	$v_{\text{radial}} = \frac{\lambda_{\text{shift}} - \lambda_{\text{rest}}}{\lambda_{\text{rest}}} \times c$	$\theta = 2.5 \times 10^5 \frac{\lambda}{D}$
<i>definition of power</i>	<i>wave equation</i>	<i>photon energy</i>	<i>Stefan-Boltzmann</i>	<i>Wien's law</i>	<i>Doppler shift</i>	<i>angular resolution</i>
$\frac{LGP_A}{LGP_B} = \frac{\text{area}_A}{\text{area}_B} = \frac{(\text{diam}_A)^2}{(\text{diam}_B)^2}$	$M = \frac{f_{\text{telescope}}}{f_{\text{eyepiece}}}$	$P = \frac{F}{A}$	$D = \frac{m}{V}$	$PV = nRT$	$d(\text{pc}) = \frac{1}{p''}$	$b = \frac{L}{4\pi d^2}$
<i>light gathering power</i>	<i>magnification</i>	<i>*pressure</i>	<i>*density</i>	<i>ideal gas law</i>	<i>distance parallax</i>	<i>apparent brightness</i>
$L = 4\pi d^2 b$	$L = 4\pi R^2 \sigma T^4$	$m - M = 5 \log \left(\frac{d}{10} \right)$	$d = 10^{\left(\frac{m-M+5}{5} \right)}$	$(M_A + M_B) = \frac{a^3}{p^2}$		
<i>*luminosity #1</i>	<i>luminosity #2</i>	<i>distance #1</i>	<i>distance #2</i>	<i>star masses</i>		