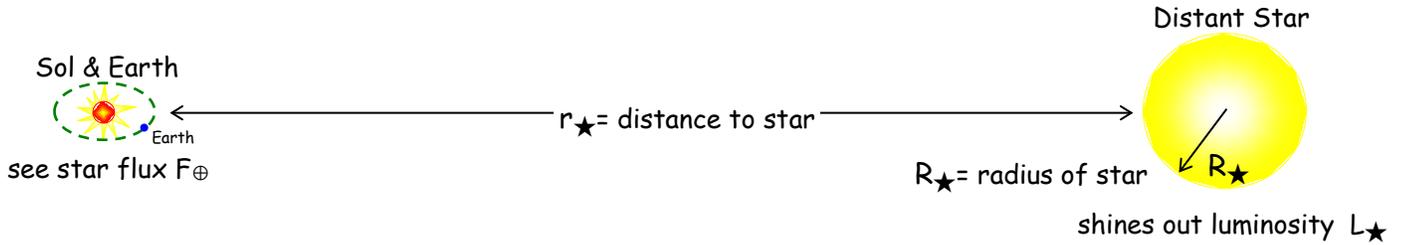


STAR MAGNITUDES, LUMINOSITIES, AND FLUXES



LUMINOSITY AND MAGNITUDES⁵⁶

²The luminosity of a star can be found using that of the sun and their magnitudes: $M_{SOL} = 4.82$

LUMINOSITY COMPARED TO SOL FROM MAGNITUDES

$$L_{\star,sl} = \left(10^{\left(\frac{M_{SOL} - M_{\star}}{2.5} \right)} \right) \text{ Solar Luminosities} \quad \text{Eqn. (1)}$$

LUMINOSITY IN WATTS

$$L_{\star,W} = L_{\star,sl} \times (3.83 \times 10^{26}) \text{ Watts} \quad \text{Eqn. (2)}$$

WARNING!! USE X10^x OR EE KEY (NOT x10^(26) SEQUENCE!)

THE FLUX OF A STAR AT EARTH

The relationship between the luminosity of a star and the flux received at Earth is given by the inverse square law,

STAR FLUX AT THE EARTH

$$F_{\oplus} = \frac{L_{\star,W} \text{ (Watts)}}{4\pi(r_{\star}^2) \text{ (meter)}^2} \quad \text{Eqn. (3)}$$

Annotations: L_star must be in Watts! r_star must be in meters!

using 1 light year = 9.46×10^{15} meters and $L_{SOL} = 3.83 \times 10^{26}$ Watts, complete the table²⁸.

STAR	FIELD GUIDE TO THE STARS AND PLANETS APPENDIX A2			CALCULATED			
	V	M _V	r _* (ly)	r _* meters	L _{★,SOL} (Eqn. 1) solar lums	L _★ (Eqn. 2) Watts	F _⊕ (Eqn. 3) W/m ²
Capella (α Aur)	0.08	-0.8	42	3.97×10^{17}	177	6.77×10^{28}	3.42×10^{-8}
Castor (α CMa)	1.94	0.6	52	4.92×10^{17}	48.8	1.87×10^{28}	6.14×10^{-9}
Pollux (α CMa)	1.14	1.1	34	3.22×10^{17}	30.8	1.18×10^{28}	9.06×10^{-8}
Procyon (α CMi)	0.38	2.8	11	1.04×10^{17}	6.4	2.46×10^{27}	1.81×10^{-8}
Sirius (α CMa)	-1.46	1.5	9	8.51×10^{16}	21.3	8.14×10^{27}	8.94×10^{-8}
Rigel (β Ori)	0.12	-6.6	773	7.31×10^{18}	36,983	1.42×10^{31}	2.11×10^{-8}
Aldebaran (α Tau)	0.85	-0.8	65	6.15×10^{17}	177	6.77×10^{28}	1.43×10^{-8}

Does one of these stars impress you? Who and Why? Should we start warning people about possible star-burn²⁹?

Rigel is BLAZING!! 37 thousand times more luminous than Sol!!

Sure, warn people! I'm sure someone could sell people star block!

Don't skip This!