

Wednesday, March 4, 2026

Example: How much brighter is Sirius than Betelgeuse?

magnitude

$$m_1 = -1.5$$

magnitude

$$m_2 = +0.5$$

$$\frac{b_1}{b_2} = \frac{\text{brightness of Sirius}}{\text{brightness of Betelgeuse}} = 2.512^{(m_2 - m_1)}$$

$$m_2 - m_1 = 0.5 - (-1.5) = 2.0$$

$$\Rightarrow \frac{b_1}{b_2} = (2.512)^{2.0} = 6.31$$

\Rightarrow Sirius is 6.31 times brighter than Betelgeuse

i.e. your eye receives 6.31 times more photons/second from Sirius than from Betelgeuse