3. The solar constant refers to the solar flux received on Earth. Assuming $L_\odot = 3.828 \times 10^{33}$ erg s^{-1},

$$F_\odot = \frac{L_\odot}{4\pi AU^2}, \text{ where } AU = 1.49598 \times 10^{13} \text{ cm}$$

$$F_\odot = 1.3612 \times 10^{6} \text{ erg s}^{-1} \text{ cm}^{-2}$$

The solid angle subtended by the Sun from Earth is

$\Omega \approx A_\odot / d_\odot^2$, where $A_\odot$ is the area of the sun and $d_\odot$ is the distance

$$\Omega \cong 6.8 \times 10^{-5} \text{ sr}$$

The surface brightness of the Sun from Earth is therefore

$$I_\odot = F_\odot / \Omega = 2.002 \times 10^{10} \text{ erg s}^{-1} \text{ cm}^{-2} \text{ sr}^{-1}$$

The Sun-Jupiter distance is on average 5.2 AU, so from Jupiter, the solar constant is

$$F_\odot = \frac{L_\odot}{4\pi (5.2 AU)^2} = 5.0338 \times 10^{4} \text{ erg s}^{-1} \text{ cm}^{-2}$$

The solid angle of the sun from Jupiter is

$$\Omega \approx A_\odot / (5.2 AU)^2 = 2.515 \times 10^{-6} \text{ sr}$$

the surface brightness of the Sun from Jupiter is

$$I_\odot = F_\odot / \Omega = 2.002 \times 10^{10} \text{ erg s}^{-1} \text{ cm}^{-2} \text{ sr}^{-1}$$

Indeed, $I_\odot$ is independent of distance.

4(1) The $g=17$ star is brighter. Pogson's equation tells us how much brighter:

$$F_1/F_2 = \left[100^{1/5}\right]^{-(m_1-m_2)} = 2.512^{-(m_1-m_2)}$$

$$F_1/F_2 = 2.512^{-(19.5-17)} = 0.1$$

so the $g=17$ star is $10\times$ brighter than the $g=19.5$ star.

4(2) star A is $10\times$ brighter

4(3) $B-V=0$ implies that equal amounts of flux were recorded in the B and V filters, and hence a flat spectrum (in F_λ). The slope is dependent on whether the F_ν or F_λ is being plotted. If F_ν is plotted, the result is a slope that rises toward the blue.