$$\frac{\text{Brightness of planet}}{\text{Brightness of star}} = \frac{B_p}{B_s} = \frac{\text{surface area of planet}}{\text{surface area of star}}$$

$$= \frac{4\pi R_p^2}{4\pi R_s^2}$$

$$= \left(\frac{R_p}{R_s}\right)^2$$

$$\frac{\text{Brightness of planet}}{\text{Brightness of star}} = \frac{B_p}{B_s} = \frac{\text{surface area of planet}}{\text{surface area of orbit}}$$

$$= \frac{4\pi R_p^2}{4\pi r_{orb}^2}$$

$$= \left(\frac{R_p}{r_{orb}}\right)^2$$