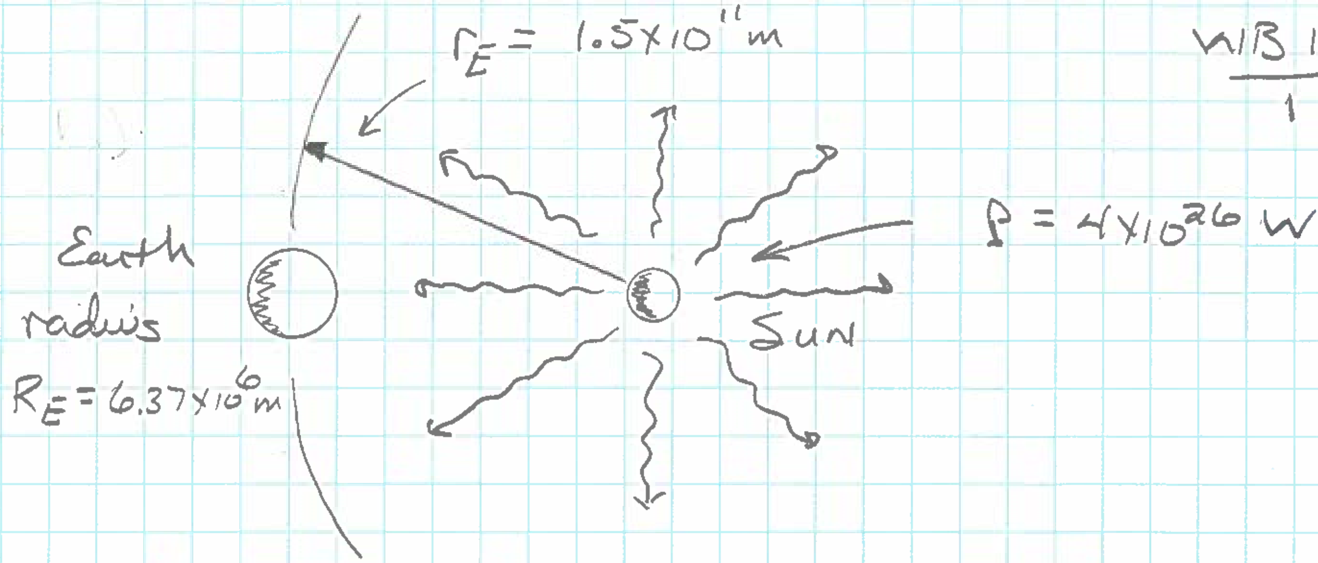


a.) The intensity of radiation at the distance of the Earth is

$$I = \frac{P}{4\pi r_E^2} = 1415\ \frac{W}{m^2}$$

b.) The Earth intercepts an amount ∝ cross sectional area

$$\text{Power intercepted} = \pi R_E^2 I$$

$$P_E = 1.80\times10^{17}\ \text{WATTS}$$

So, total energy available in 1 day:

$$E = P_E\ 1\,\text{day}\left(\frac{24\,h}{1\,\text{day}}\right)\left(\frac{3600\,s}{1\,h}\right)$$

$$= \underline{1.56\times10^{22}\ J}$$

Energy in money; how much money is there in a day's worth of solar energy intercepted by the Earth?

1 kwh ≈ 10¢ and 1 kwh = 3.6 MJ

So:

$$\text{Value} = 1.56\times10^{22}\,J\left(\frac{0.1\ \$/\text{kwh}}{3.6\times10^{6}\ \frac{J}{\text{kwh}}}\right) = \$\,4.33\times10^{14}$$

$$= \underline{\$\,433\ \text{Trillion}}$$