Light Intensity

$d \rightarrow 4400$ Lux

$2d \rightarrow 1000$ Lux $\rightarrow \frac{1000}{4400} \approx \frac{1}{4}$

OR $\frac{1}{5}$

$3d \rightarrow 450 \rightarrow \frac{450}{4400} \approx \frac{1}{9}$

$4d \rightarrow 250 \rightarrow \frac{250}{4400} \approx \frac{1}{18}$

OR $\frac{1}{20}$

$$\text{Intensity} \propto \frac{1}{d^2}$$

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sphere $\rightarrow$ surface area

$4\pi r^2$

$$\text{Intensity} = \frac{\text{Initial Intensity}}{4\pi r^2}$$

Newton's Law of Gravitation

$$F = \frac{G m_1 m_2}{r^2}$$

G → gravitational constant

$\frac{1}{4}r$ $\quad F_g = \frac{G m_1 m_2}{r^2}$

$= \frac{G m_1 m_2}{\left(\frac{1}{4}r\right)^2}$

$= \frac{G m_1 m_2}{\left(\frac{1}{16}\right) r^2}$

$= 16 \boxed{\frac{G m_1 m_2}{r^2}}$

F_g

$= 16 F_g$

- Third Column

  Use 780 N for F_g in second column

- Fourth column → $g = \frac{GM}{r^2}$

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2) $m = 2m_E$

$r = 3r_E$

$$g = \frac{GM}{r^2}$$

$$= \frac{G(2m_E)}{(3r_E)^2}$$

$$= \frac{2}{9}\left[\frac{GM_E}{r_E^2}\right]$$

$$= \frac{2}{9}g$$