

Moon gravity force vs. Earth gravity force

Can the moon's gravity be used to pull a ship out of Earth's gravity well? Obviously no, otherwise things floating in low Earth orbit would be pulled to the moon...

$$\text{G} := 6.6742 \cdot 10^{-11} \cdot \frac{\text{m}^3}{\text{kg} \cdot \text{sec}^2}$$

$$\text{Gravity}(\text{m}, \text{r}) := \frac{\text{G} \cdot \text{m}}{\text{r}^2}$$

$$\text{M}_{\text{Earth}} := 5.97219 \cdot 10^{24} \text{ kg}$$

$$\text{M}_{\text{Moon}} := 7.3477 \cdot 10^{22} \text{ kg}$$

$$\text{r}_{\text{Earth}} := 6371 \text{ km} + 10000 \text{ ft} = 6.401 \times 10^3 \text{ km}$$

$$\text{r}_{\text{Moon}} := 384399 \text{ km} + 1735 \text{ km} = 3.861 \times 10^5 \text{ km}$$

$$\text{Gravity}_{\text{earth}} := \text{Gravity}(\text{M}_{\text{Earth}}, \text{r}_{\text{Earth}}) = 0.992 \text{ g}$$

$$\text{Gravity}_{\text{Moon}} := \text{Gravity}(\text{M}_{\text{Moon}}, \text{r}_{\text{Moon}}) = 3.354 \times 10^{-6} \text{ g}$$