EX 27.2 Electricity & gravity

$$F_G = G\frac{M_{Sun}M_{earth}}{r_{SE}^2}$$

$$F_E = k\frac{q_{Sun}q_{earth}}{r_{SE}^2}$$

← total charge of sun made of protons

← " " " earth " " "

$$\frac{F_G}{F_E} = \frac{G m_S m_e}{k q_S q_e}$$

$$q_S = N_S q_\oplus = \frac{m_S}{m_\oplus} q_\oplus$$

← number of protons in the sun.

← charge of one proton

$$q_e = N_e q_\oplus = \frac{m_e}{m_\oplus} q_\oplus$$

$$\frac{F_G}{F_E} = \frac{G}{k}\frac{m_S m_e}{\frac{m_S}{m_+}q_+ \frac{m_e}{m_+}q_+} = \frac{G}{k}\frac{m_+^2}{q_+^2} =$$

$$\boxed{\frac{F_G}{F_E} = 8\times10^{-37}}$$

Ratio of gravitational & electrical forces. Gravity is only strong when electric forces cancel each other out, as when ⊕ and ⊖ charges neutralize each other.