First assignment

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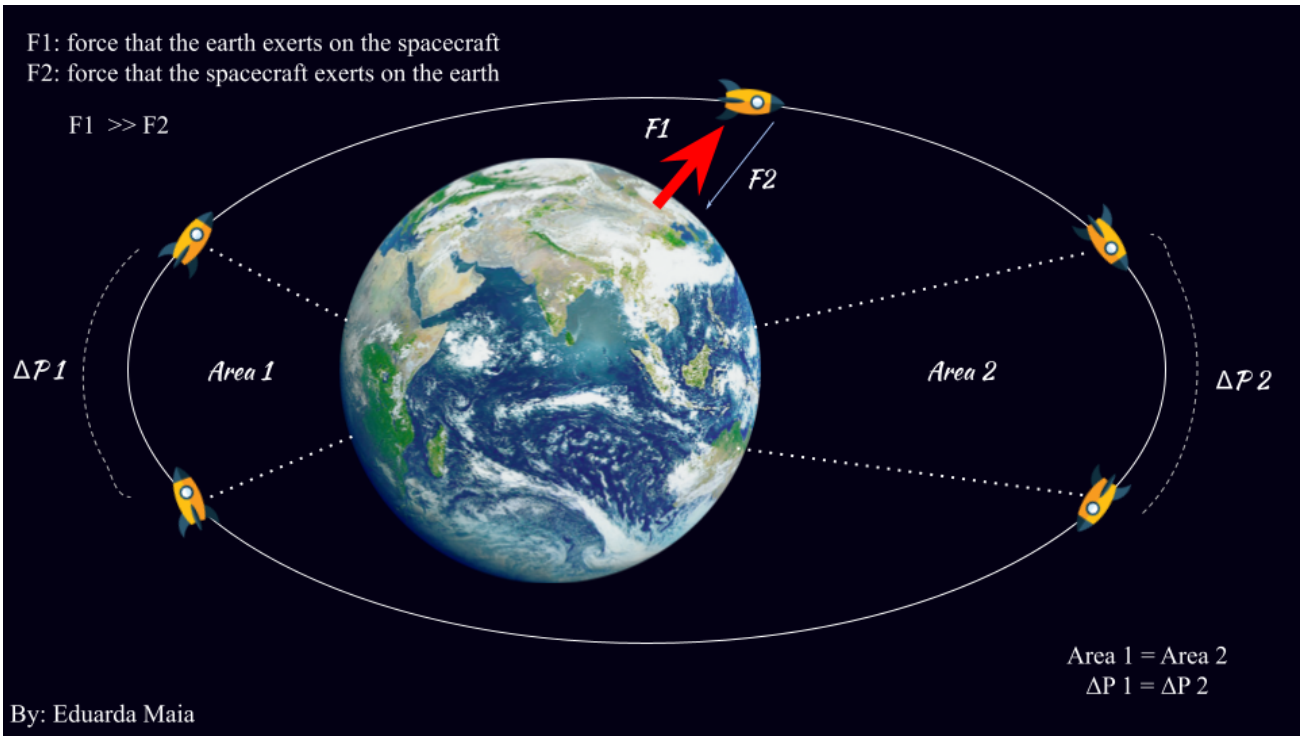
Diagram:



$G = 6.67 \times 10^{-11}\ kg^{-1}s^{-2}$

$M_S = 1.02 \times 10^{-1}\ kg$

$M_E = 5.97 \times 10^{24}\ kg$

$R = 6.37 \times 10^{6}\ m$

1. **Period in which the spacecraft will orbit the earth:**

$$p^2 = \frac{4\pi^2}{GM_E}R^3$$

$$p^2 = \frac{4.00\times(3.14)^2}{(6.67\times10^{-11})\times(5.97\times10^{24})}\times(6.37\times10^{6})^3$$

$$p = 5059.63s$$

$$p \simeq 1\ hour\ and\ 15\ minutes$$

2. **Velocity of orbit:**

$$V = \sqrt{\frac{GM_E}{R}}$$

$$V = \sqrt{\frac{(6.67\times10^{-11})\times(5.97\times10^{24})}{6.37\times10^{6}}}$$

$$V = 79.1 \times 10^{2}\ m/s$$

3. **The force characteristics between the Earth and the spacecraft:**

$$F = \frac{GM_S M_E}{R^2}$$

$$F = \frac{(6.67\times10^{-11})\times(1.02\times10^{-1})\times(5.97\times10^{24})}{(6.37\times10^{6})^{2}}$$

$$F = 1.00\ N$$