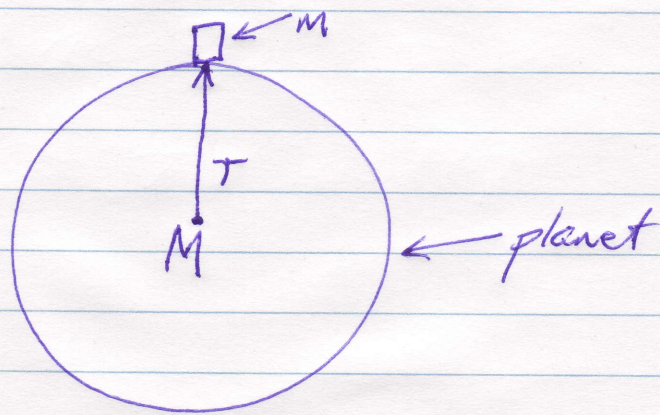


Exercise:



Weight of mass m can be expressed as:

$$W_m = mg \quad \text{or} \quad W_m = \frac{mM}{r^2} \cdot G, \quad \text{where } r = \text{radius of earth}$$

$$\therefore mg = \frac{mM}{r^2} G$$

$$\therefore g = \frac{MG}{r^2}$$

This is the formula for acceleration due to gravity on a planet of mass M + radius r .

eg Acceleration due to gravity on Mars:

$$g_{\text{Mars}} = \frac{6.4174 \times 10^{23} \times 6.6738 \times 10^{-11}}{(3396.2 \times 10^3)^2}$$
$$= \underline{3.7132 \text{ ms}^{-2}}$$