# 1 Newton's Law of Gravitation

*Any two masses in the universe attract one another with a force that is proportional to the product of the two masses and inversely proportional to the square of the distance between them.*

$$F = \frac{GMm}{r^2} \quad \text{(N)}$$

Where G is the **Universal Gravitational Constant**[1], $M$ and $m$ are two **masses** (kg) of two different bodies and $r$ the **radius** (m) between the primary and secondary bodies respectively.

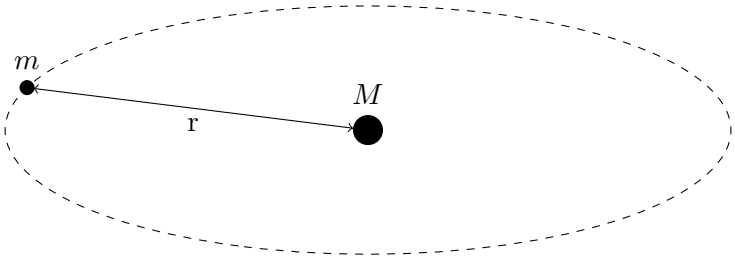
# 2 Gravitational field strength:

$$g = \frac{GM}{R^2} \quad (\mathrm{N\,kg^{-1}})$$

Where G is the **Universal Gravitational Constant**[1], $M$ is the **mass** (kg) of a body and $R$ the **distance** (m) between the center of the body to the point where the field strength is to be measured[2].

# 3 Velocity of Orbit:

$$v = \sqrt{\frac{GM}{r}} \quad (\mathrm{m\,s^{-1}})$$




Where G is the **Universal Gravitational Constant**[1], $M$ is the **mass** (kg) of the priamry body.

# 4 Kepler's Third Law

$$T^2 = \frac{4\pi^2 r^3}{GM} \quad (1)$$

Where $T$ is the **time of orbit** (s), $r$ is the **distance** (m) between the center primary body and the center of the secondary body.

[1] $6.67 \times 10^{-11}\,\mathrm{N\,m^2\,kg^{-2}}$

[2] Most of the time this is the radius of a planet, where the field strength is measured at its surface.