1 | Escape Velocity and Gravitational Potential Energy

1.1 | Newton's Universal Gravitation Law

$$\vec{F_g} = -\frac{GM_1M_2}{r^2}\hat{r} \tag{1}$$

where, $\vec{F_g}$ is the force of gravity on M_2; M_1 and M_2 are two point masses; G the universal gravitation constant; r the magnitude of the vector from M_1 to M_2 and $\hat{r}$ the unit vector in the $\vec{r}$ direction.

Also, introduce the following variables:

- M_e for the mass of the earth
- g for the acceleration of gravity on the surface of the Earth

1.2 | Equation for Gravitational Potential Energy

The general equation for work is as follows:

$$W = \frac{dF}{dx}dx \tag{2}$$

The total gravitational potential energy induced by performing work to move the object from