Answer on Question #60228-Physics-Other

At what height from the surface of earth the weight will be quartered?

Solution

Let the distance above surface be h, radius of earth be R.

$$g'(above\ surface\ of\ earth) = \frac{g(\ on\ surface)}{4}$$

$$g'(above) = \frac{GM}{(R\ +\ h)^2} = \frac{GM}{R^2\left(1\ +\frac{h}{R}\right)^2}$$

$$g(\ on\ surface) = \frac{GM}{R^2}$$

Putting value of $\frac{GM}{R^2}$ as g from above in equation of g'.

$g' = g\frac{1}{\left(1+\frac{h}{R}\right)^2}$ as we know equal to g/4.

$$\frac{1}{\left(1\ +\frac{h}{R}\right)^2} = \frac{1}{4} \rightarrow h = R = 6400\ \text{km}.$$

So, its 6400 km above surface of earth.