Answer on Question #76073, Physics / Mechanics | Relativity | for completion

The gravitational potential at a distance 2.26x107 m from the centre of a planet of radius 8.55x106 m is -5.64x107 J kg -1.

Calculate the gravitational potential at a distance 7.2x107 m from the centre of the planet,

$$V_1 = -5.64 * 10^7 \frac{J}{kg}, r_1 = 2.26 * 10^7 m, r_2 = 7.2 * 10^7 m.$$

Gravitational potential can be found from expression: $V(x) = -\frac{GM}{x}$.

We can derive the expression for GM: $V_1 = -\frac{GM}{r_1}, -GM = V_1 r_1$.

Now let us obtain the value of gravitational potential an distance r_2: $V_2 = -\frac{GM}{r_2} = \frac{V_1 r_1}{r_2} = \frac{-5.64*10^7*2.26*10^7}{7.2*10^7} = -1.77 * 10^7 \frac{J}{kg}$.

Answer: -1.77*10^7 J/kg.