

Answer on Question #70869 – Physics – Astronomy | Astrophysics

An astronomical object has its mass 4 times the mass of earth and radius half of the radius of earth. If acceleration due to gravity at earth is g , find its value at the surface of the astronomical object.

Solution. On Earth we have the following equality:

$$g_E = \frac{GM_E}{R_E^2}.$$

For astronomical object

$$g_A = \frac{GM_A}{R_A^2} = \frac{G(4M_E)}{\left(\frac{1}{2}R_E\right)^2} = 16g_E \approx 157m \cdot s^{-2}.$$

Answer. $g_A = 157m \cdot s^{-2}$.

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