Answer on Question #42596 – Physics - Mechanics | Kinematics | Dynamics

if a mass of a planet is 10% less than that of earth and the radius 20% greater than that of earth the acceleration due to gravity on the planet will be?

Solution:

$g_e -$ acceleration due to gravity of the Earth;

$g_p -$ acceleration due to gravity of the planet;

$M_p = 0.9M_e -$ mass of the planet;

$R_p = 1.2R_e -$ radius of the planet;

Formula for the acceleration bue to gravity (gravitation equation):

$$g_e = G\frac{M_e}{R_e^2} \quad (1)$$

$$g_p = G\frac{M_p}{R_p^2} = G\frac{0.9M_e}{(1.2R_e)^2} \quad (2)$$

$$(2) \div (1):$$

$$\frac{g_p}{g_e} = \frac{\frac{0.9M_eG}{(1.2R_e)^2}}{\frac{M_eG}{R_e^2}} = \frac{0.9M_eG}{(1.2R_e)^2} \cdot \frac{R_e^2}{M_eG} = \frac{0.9}{1.2^2}$$

$$g_p = g_e\frac{0.9}{1.2^2} = 0.625 \cdot 9.8\frac{m}{s^2} = 6.13\frac{m}{s^2}$$

Answer: acceleration due to gravity on the planet will be $6.13\frac{m}{s^2}$.