If both, the mass and the radius of the earth decrease by 1%, what will be the% change in the gravitational acceleration ?

Solution:

Gravitation acceleration on the surface of the Earth is given by:

$$g = \frac{GM}{R^2}$$

Where G is the gravitational constant, M is mass of the Earth and R is the radius of the Earth.

According to the problem:

$$M_2 = 0.99\,M$$

$$R_2 = 0.99\,R$$

Thus:

$$g_2 = \frac{G*(0.99M)}{(0.99R)^2} = \frac{0.99}{(0.99)^2}\frac{GM}{R^2} = \frac{0.99}{(0.99)^2}*g \approx 1.01\,g$$

So in the gravitational acceleration will increase by approximately 1%.

<u>Answer</u>: the gravitational acceleration will increase by approximately 1%.