

## Answer on Question 56913, Physics, Solid State Physics

### Question:

If the radius of Earth decreased with no change in mass, your weight would

- a) increase
- b) decrease
- c) stay the same

### Solution:

By the definition of the weight we have:

$$W = mg = G \frac{M_E m}{R_E^2},$$

here,  $m$  is the mass of the person,  $g = G \frac{M_E}{R_E^2}$  is the acceleration due to gravity,  $G$  is the gravitational constant,  $M_E$  is the mass of Earth,  $R_E$  is the radius of Earth.

As we can see from the formula above, if the radius of Earth decreased with no change in mass, your weight would increase.

### Answer:

- a) increase