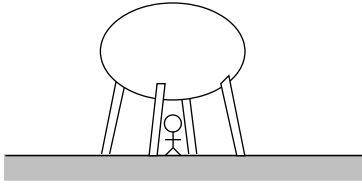


Chapter 8 Problem 36 †



Given

$$r = 15 \text{ m}$$

$$m = 4.0 \times 10^6 \text{ kg}$$

Solution

Find the fraction that your weight is reduced under the water tower.

Your weight due to earth's gravity is

$$F_e = mg = m(9.80 \text{ m/s}^2)$$

The force exerted on you by the water tower is

$$F_w = (6.672 \times 10^{-11} \text{ Nm}^2/\text{kg}^2) \frac{4.0 \times 10^6 \text{ kg} m}{15 \text{ m}^2}$$

$$F_w = m(1.19 \times 10^{-6} \text{ m/s}^2)$$

The fraction that the water tower exerts compared to the earth is

$$\frac{F_w}{F_e} = \frac{m(1.19 \times 10^{-6})}{m(9.80)} = 1.21 \times 10^{-7}$$

†Problem from Essential University Physics, Wolfson