

Problem 1-1

What is the weight in newtons of an object that has a mass of (a) 8 kg, (b) 0.04 kg, and (c) 760 Mg?

Solution

The weight of an object W is obtained by multiplying the mass m by the acceleration due to gravity g .

$$W = mg$$

For the weight to be in newtons, m has to be in kilograms, and $g = 9.81 \text{ m/s}^2$. If $m = 8 \text{ kg}$, then

$$W = (8 \text{ kg}) \left(9.81 \frac{\text{m}}{\text{s}^2} \right) \approx 78.5 \text{ N.}$$

If $m = 0.04 \text{ kg}$, then

$$W = (0.04 \text{ kg}) \left(9.81 \frac{\text{m}}{\text{s}^2} \right) \approx 0.392 \text{ N.}$$

If $m = 760 \text{ Mg}$, then

$$W = \left(760 \text{ Mg} \times \frac{10^6 \text{ g}}{1 \text{ Mg}} \times \frac{1 \text{ kg}}{1000 \text{ g}} \right) \left(9.81 \frac{\text{m}}{\text{s}^2} \right) \approx 7.46 \times 10^6 \text{ N.}$$

This second answer is in disagreement with the one at the back of the book.