Task:

A sample of iron has the same dimensions of 2.0cm X 3.0cm X 2.0cm. If the mass of this rectangular shaped object is 94.0 g what is the density of iron?

Solution:

We find the volume a sample of iron:

$$V = a \times b \times c = 2.0 \times 3.0 \times 2.0 = 12.0 \, cm^3.$$

The density of a substance is its mass per unit volume.

Mathematically, density is defined as mass divided by volume:

where ρ is the density, m is the mass, and V is the volume.

$$\rho = \frac{m}{V},$$

Then,

$$\rho = \frac{m}{V} = \frac{94.0 \, g}{12.0 \, cm^3} = 7.833 \, {g}\!\!\left/\!\!{cm^3}\right.$$

Answer:

$$\rho = 7.833 \, {g}\!\!\left/\!\!{cm^3}\right. = 7833 \, {kg}\!\!\left/\!\!{m^3}\right.$$