

Dr Oliver Mathematics
Worked Examples
Mass, Density, and Volume 2

From: Edexcel 2019 November Paper 3H (Calculator)

1. Liquid *A* and liquid *B* are mixed together in the ratio 2 : 13 by volume to make liquid *C*. (4)

Liquid *A* has density 1.21 g/cm^3 .

Liquid *B* has density 1.02 g/cm^3 .

A cylindrical container is filled completely with liquid *C*.

The cylinder has radius 3 cm and height 25 cm.

Work out the mass of the liquid in the container.

Give your answer correct to 3 significant figures.

You must show all your working.

Solution

We recall

$$\text{density} = \frac{\text{mass}}{\text{volume}}.$$

Liquid *C* has density

$$\begin{aligned} \frac{(2 \times 1.21) + (13 \times 1.02)}{2 + 13} &= \frac{2.42 + 13.26}{15} \\ &= \frac{15.68}{15} \\ &= \frac{392}{375} \text{ g/cm}^3. \end{aligned}$$

Now,

$$\begin{aligned} \text{volume} &= \pi \times 3^2 \times 25 \\ &= 225\pi \text{ cm}^3. \end{aligned}$$

Finally,

$$\begin{aligned} \text{mass} &= \text{density} \times \text{volume} \\ &= \frac{392}{375} \times 225\pi \\ &= 738.902\,592\,1 \text{ (FCD)} \\ &= \underline{\underline{739 \text{ g (3 sf)}}}. \end{aligned}$$