86. Note that "surface area" refers to the *total* surface area of all six faces, so that the area of each (square) face is $24/6 = 4$ m^2. From Archimedes' principle and the requirement that the cube (of total volume V and density ρ) floats, we find

$$\rho V g = \rho_w V_{\text{sub}} g \quad \Longrightarrow \quad \frac{\rho}{\rho_w} = \frac{V_{\text{sub}}}{V}$$

for the fraction of volume submerged. The assumption that the cube floats upright, as described in this problem, simplifies this relation to

$$\frac{\rho}{\rho_w} = \frac{h_{\text{sub}}}{h}$$

where h is the length of one side, and $\rho_w = 4\rho$ is given. With $h = \sqrt{4} = 2$ m, we find $h_{\text{sub}} = h/4 = 0.50$ m.