24. (a) Archimedes' principle makes it clear that a body, in order to float, displaces an amount of the liquid which corresponds to the weight of the body. The problem (indirectly) tells us that the weight of the boat is $W = 35.6$ kN. In salt water of density $\rho' = 1100\,\text{kg/m}^3$, it must displace an amount of liquid having weight equal to 35.6 kN.

   (b) The displaced volume of salt water is equal to

$$V' = \frac{W}{\rho' g} = \frac{35600}{(1100)(9.8)} = 3.30 \text{ m}^3 .$$

   In freshwater, it displaces a volume of $V = W/\rho g = 3.63\,\text{m}^3$, where $\rho = 1000\,\text{kg/m}^3$. The difference is $V - V' = 0.33\,\text{m}^3$.