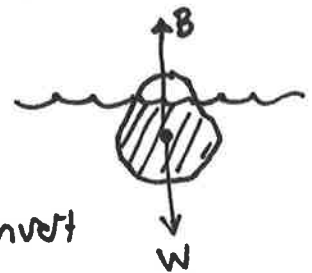ASG v2 EX 3.1 (Floating iceberg)

The iceberg floats when it is submerged just enough so that the buoyant force balances its weight. According to Archimedes' principle, the buoyant force acting on an object equals the weight of the fluid it displaces.

$$B = \rho_w V_w g \longleftarrow \text{acceleration of gravity (used to convert mass to force.)}$$

buoyant force ⌐ ∟density of water

∟volume of water displaced

$$W = \rho_I V_I g$$

weight of iceberg ⌐ ∟density of ice ⌐ volume of iceberg

Setting $B = W$ (for equilibrium), $\rho_I V_I g = \rho_w V_w g$

or $\dfrac{\rho_I}{\rho_w} = \dfrac{V_w}{V_I}$ so $\dfrac{0.917\,g/cc}{1.03\,g/cc} = \dfrac{V_w}{V_I} = 0.89$

So 89% of the iceberg is underwater.