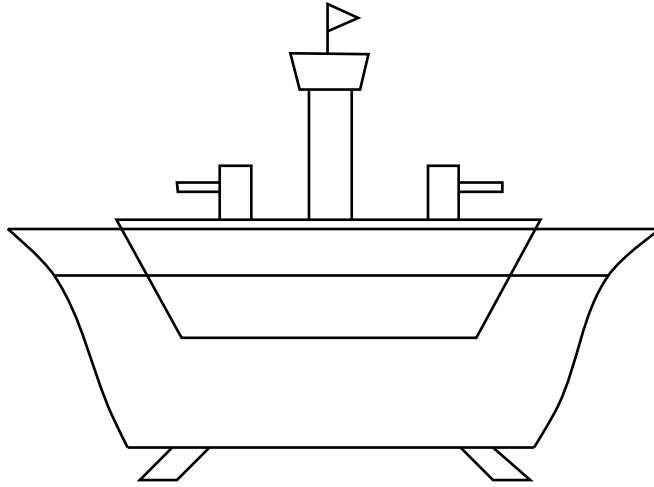Can a battleship float in a bathtub? Of course, you have to imagine a very big bathtub or a very small battleship. In either case, there is just a bit of water all around and under the ship. Specifically, suppose the ship weighs 100 tons (a very small ship) and the water in the tub weighs 100 pounds.
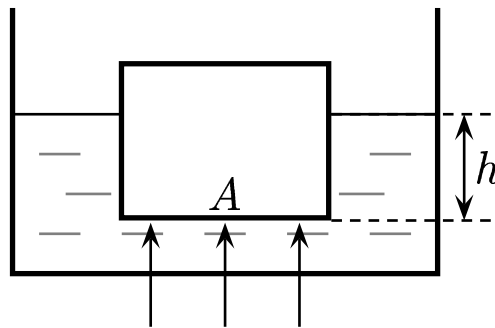

Will it float or touch bottom?

A)   It will float if there is enough water to go all around it.

B)   It will touch bottom because the ship's weight exceeds the water's weight.

Consider an analogous situation of having a hollow steel rectangular block float in a container. Since pressure is a scalar, at a given depth, it is the same in all directions. At the bottom of the block, the pressure due to the liquid column is $P_{bottom} = \rho g h$. This gives an upward lifting force: $F_{bottom} = \rho g h A = m g =$"weight of displaced water". In other words, as long as there is water column connected to the bottom, there is the buoyant force which equals to weight of the water displaced.

Answer **A**.