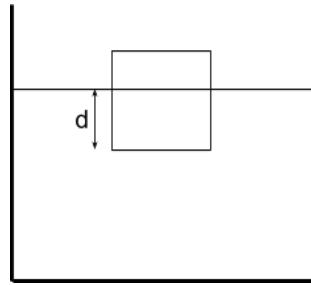


Physics 4C: Collected Homework 1

Solutions are not considered complete without the logical argument and/or full calculation.

1. A cubic block of side length b and density ρ_0 floats in a liquid. The liquid has a density that depends on depth, h , as $\rho(h) = \rho_0 + \frac{\rho_0}{\ell}h$, where ρ_0 and ℓ are positive constants. At what depth, d , is the base of the block beneath the surface of the liquid?



2. A horizontal pipe of varying cross-section has two manometric tubes attached to it at two points where the cross sections of the pipe are S_1 and S_2 .
 - (a) In which cross section will the height of the fluid in manometer tube be greater and why?
 - (b) Find the volume of water that flows across a cross section of the pipe per unit time if the difference in the height of the water columns in the manometric tubes is equal to Δh .

