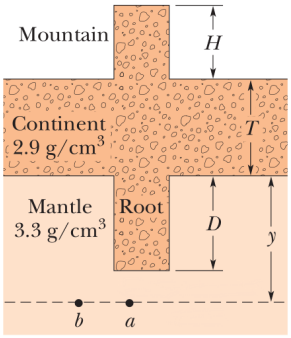
Physics 9B Fall 2013 - Discussion #8



1. The light continental rocks in the Earth's crust are less dense than the molten mantle below. In order to maintain hydrostatic equilibrium, a mountain of continental material must have a corresponding root that extends beneath it. Consider a mountain of height $H = 6.0$ km on a continent of thickness $T = 32$ km, with the given continental and mantle densities. Calculate the depth D of the root (*Hint*: the pressures at point a and b must be equal; the depth y of this reference point should cancel out).
2. A hollow plastic sphere is held below the surface of a lake by a cord anchored to the bottom of the lake. It has a volume of 0.65 m^3 and the tension in the cord is 900 N. What is the mass of the sphere?
3. You might have noticed that water from a faucet does not fall directly down as a cylinder, but tapers inward to a narrower radius. If the radius of the faucet is R and the water leaves the faucet at speed v_0, find an expression for the radius of the water column after the water has fallen a height h.

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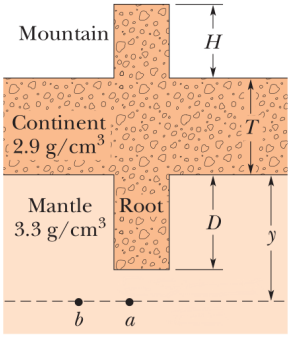

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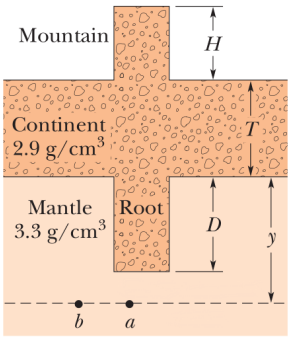

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