

Homework 2

Answer each of these problems carefully and with plenty of explanation of your reasoning and/or how you found your answer. Homework is due to me in class on **Friday, 27 Sept** at the **start** of class. No late homework will be accepted.

You may get help from each other, from the Learning and Writing Center (good for math help), or especially from John. You may *not* use **solutions** from elsewhere, such as the internet. Acknowledge any help you received at the end of each problem. (Something like, "I worked with Blast Hardcheese on this problem," or "I am indebted to Mrs. Peacock for her help with this problem.") Also, remember to cite any sources you use for values or equations. (eg, "The mass of the Earth came from Appendix Q in the Hewitt.")

You must use your own words to write up your solution to prove that you understand. This means your solutions should be distinct from your classmates', even if you work together to solve the problem.

1. Calculate the pressure at the base of the Hoover dam where the water depth is 220 m. **(10 pts)**
2. If the pressure in the ocean were the same at all depths, would there be a buoyant force? Explain clearly why or why not. **(6 pts)**
3. A boat floats in the ocean. The water level comes up to a marking on the side of the boat. If a load of Styrofoam is added to the boat, will the new water level be above the previous mark, below it, or will it remain the same? Explain. **(6 pts)**
4. While I was watching a barge enter a lock and dam in Minnesota, I saw it accidentally dump its load of iron ore into the water. The lock was closed, so it was as if the barge was in a small, self-contained lake of its own. If the water level was at that "9 feet" mark before the barge dumped the iron, was it higher, lower, or the same after? Explain clearly. **(6 pts)**
5. How would Aristotle explain each of the following? **(9 pts)**
 - a. A helium balloon rising.
 - b. A balloon filled with warm air rising, but cold air sinking.
 - c. A ball keeps moving upward even after it leaves your hand.