Submit online (email ideally or Canvas) by midnight September 10. Whether you submit by email or Canvas:

1) Make sure that the entire assignment is in a single document (e.g., don't photograph and attach each page). I will only download 1 document per person.
2) Make sure that your name is on the document that you submit. Not just on the filename but on the document itself.
3) Make sure that your name is in the title of the document you submit. Name your document using this convention: LASTNAME_HW3_SEM_YEAR

You can email or upload assignments into Canvas, but they should have these same 1-3 elements.
Due Tuesday, 10 September 2024 at midnight – Submit via email (.pdf or .doc formats only to gcutter@odu.edu), or on Canvas.
These are to be done independently, NO group efforts.

Please show your work so I can appreciate how you got your answer

1a. (10 points) If a block of continental crust and a block of oceanic crust are both 10 km thick, 1 km^2 in area, and are "floating" on the asthenosphere, how much higher is the top of the continental crust as compared to the oceanic crust?
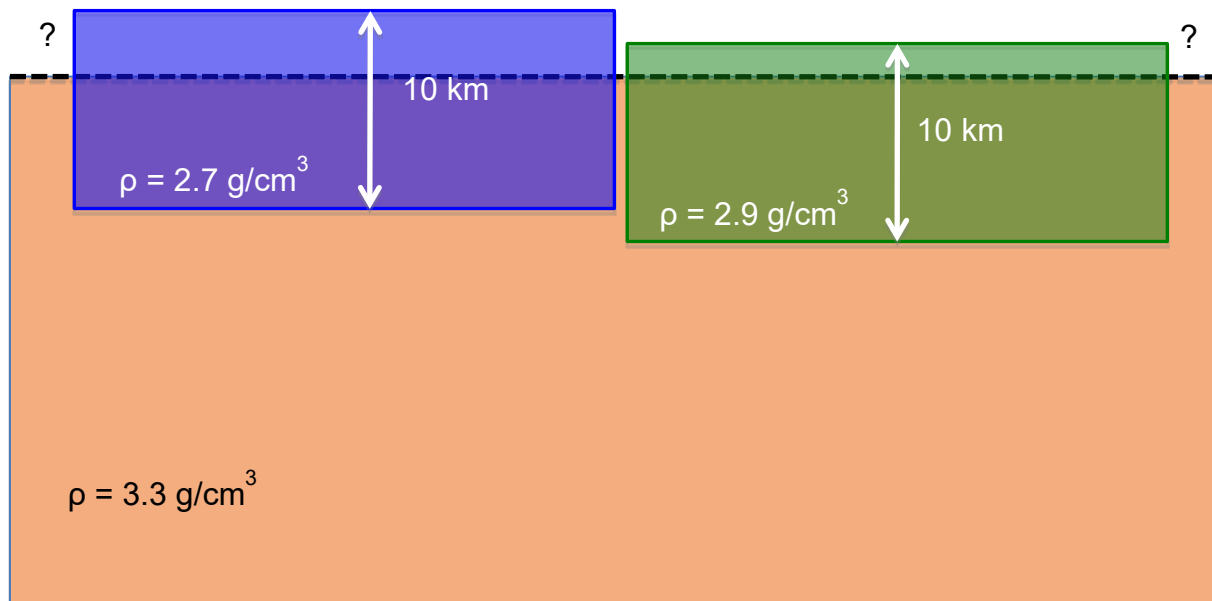
1b. (10 points) Now what is the height difference if the continental slab is 35 km thick (both still have an area of 1 km²). Which is higher and by how much? Which goes deeper into the asthenosphere and by how much?
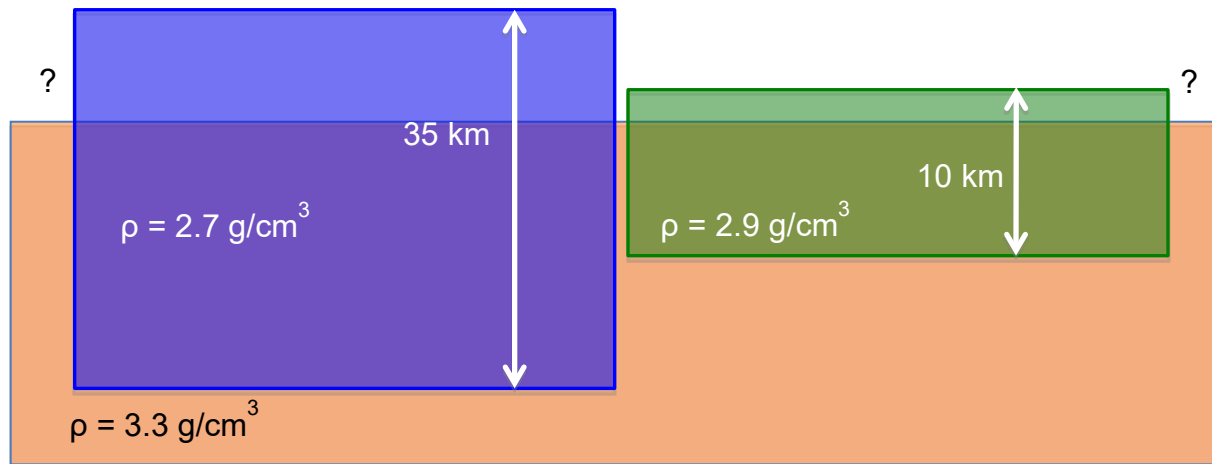
2. (20 points) The island chain of Hawai'i was formed by a mantle hot spot. The island of Maui is 1.1 million years old while the big island of Hawai'i is 0.4 million years old. How fast is the Pacific Plate moving based on these average ages? (Hint: use Google Earth to get the other data you need and assume the hot spot was under the largest volcanic peak). How does this compare to the movement of the Pacific Plate in general, and if different propose ideas to explain it?

3. (15 points) If Columbus set out from Spain to sail across the North Atlantic Ocean today, how much farther would he have to travel? Use CGS units…meters.

4. (25 pts) Calculate the sinking velocity for silt ($\varphi = 5$), very fine sand ($\varphi = 3.5$), and fine gravel ($\varphi = -1.5$) in seawater and assuming Stokes settling. (Be careful with units! State any assumptions you've made to do these calculations).

5. (20 points) Calculate the shear velocity (u_*) for an average sediment with current speeds of 0.02 m/s, 0.40 m/s, and 1.0 m/s (assume the current is measured 1 meter above the sediment bed).