Do the following problems and be prepared to discuss them in class.

1. A simple model of the Earth's interior is a spherical core surrounded by a concentric mantle shell. Find the radius of the Earth's core r_{core} relative to the total radius $r_\oplus$ if the core density is 1×10^4 kg m^{-3}, the mantle density is 4.5×10^3 kg m^{-3}, and the average density is 5.5×10^3 kg m^{-3}.
$r_{\text{core}}/r_\oplus =$

2. The equation for hydrostatic equilibrium is $\frac{\Delta P}{\Delta r} = -\rho g$. Express your answers to the following questions in the SI unit Pascals.
a) Estimate the pressure 5 km below a terrestrial continent.
b) Estimate the pressure at the center of Mercury.
c) Estimate the pressure at the center of Venus.
d) Estimate the pressure at the center of Mars.

3. Briefly explain or describe (1 sentence each):
a) cryovolcanism
b) refractory vs. volatile
c) rille
d) regolith

4. At what distance from the Sun would Mercury be pulled apart by tidal forces? How does this compare with Mercury's actual distance from the Sun?