Problem 1: Choose your hometown or your favorite city in the world. Collect the following information about the city:

1) Latitude and Longitude
2) Height above sea level
3) Average summer/winder temperature
4) Average annual precipitation
5) Natural disasters—hurricane, flood, tornado, drought, heat wave—when and damages

 Please list the source of the numbers and figures that you used.

Problem 2: Both Beijing and Indianapolis are on the 39.75°N latitude line. The longitude of Beijing is 116.40°E and the longitude of Indianapolis is 86.15°W. The radius of the Earth is 6,378km. What is the distance from Beijing and Indianapolis if you travel along the 39.75°N latitude circle?

Problem 3: The sea surface pressure is 1013 hPa $(1.013 \times 10^5$ Pascal). The density of water is 1000kg/m^3. Please use the hydrostatic equation to estimate the depth of water where the water pressure is equal to the sea surface pressure.

Problem 4: Assuming that the density of air decreases exponentially with height from a value of 1.25 kg m^{-3} at sea level, calculate the scale height that is consistent with observed global mean surface pressure of ~10^5 Pa.

[Hint: Start with the Equation $\rho(z) = \rho_0 e^{-z/H}$, where ρ_0 is the density of air at sea level.]