1. A siphon is a device for removing liquid from a container (see figure). Once the tube is filled, liquid will flow through the tube until the liquid surface in the container is level with the tube opening at A. The liquid has density $\rho$ and negligible viscosity. Assume that the container is very large.

a) What does the assumption about the size of the container tell us?

b) What is the speed of the liquid at point C?

c) What is the pressure in the liquid at point B?
d) Theoretically, what is the greatest possible height $h_1$ that a siphon can lift water?

2. A blood vessel of radius $R$ branches into two vessels of radius $R/2$, as shown below. The pressure at point A is $P_A$ and the flow rate is $Q$. The viscosity of the blood is $\eta$. What is the pressure at point B? What is the pressure at point C?
3. Why don’t all the air molecules in the atmosphere fall to the ground? Estimate the following quantities for both an oxygen molecule and a 0.1-milligram speck of dirt:

a) average kinetic energy

b) RMS (root-mean-square) velocity

c) typical height above the ground