Questions

Apply Bernoulli's equation to answer the following questions.

Question 1:

You have a horizontal hose through which water flows with a velocity of 1 m/s. If the pressure of the water within the hose is 350,000 Pa, what do you estimate the velocity of the water coming out of the end of the hose will be?

Use the density of water as 997 kg/m^3, the gravitational constant as 9.81 m/s^2, and the hose nozzle at atmospheric pressure, 101,000 Pa.

Remember that Pa has units of kg/ms^2.

Question 2:

Now let's think bigger!

Use Bernoulli's principle to predict the longest straw that you can drink out of. How long can we make the straw and still have the liquid arrive at the top?

Since this is an estimate, let's use rounded numbers for the following values: $P_{atmosphere} \cong 10^5$ Pa, $\rho_{water} \cong 10^3\,kg/m^3$, $g \cong 10\,m/s^2$

Hint 1: Assume the system is static – we are only interested in the highest point the fluid can travel up the straw, not how quickly it gets there. This means V_1 and V_2 are zero.

Hint 2: Assume you have super-human strength and so can suck hard enough on one end of the straw to make it a vacuum (pressure = 0 Pa).