# AP 2 Fluids WS 4

1. Water flows through a garden hose that has a diameter if 2.5 cm at a speed of 5.25 m/s. What is the speed of the water when it spurts out of a nozzle that has a diameter of 0.120 cm?

2. Water flows through a rubber hose that is 2.85 cm in diameter. If the hose is coupled into a nozzle that has a diameter of 0.450 cm where its velocity is 135 m/s, what is its velocity in the hose?

3. Water flowing through a hose at 4 m/s fills a 600 L child's wading pool in 8 min. What is the diameter in cm of the hose?

4. A 1.0 cm diameter pipe widens to 2.0 cm, then narrows to 5.0 mm. Liquid flows through the first segment at a speed of 4.0 m/s. a. What is the speed in the second and third segments? B. What is the volume flow rate through the pipe?

5. What does the top pressure gauge read in the figure?

200 kPa   3.0 m/s

2.0 m/s   10 m

Oil
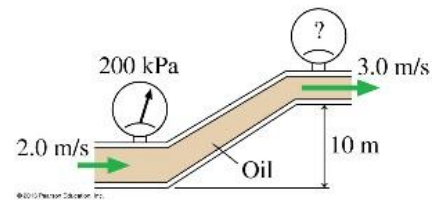
6. At a given instant, the blood pressure in the heart is 1.6 x 10⁴ Pa. If an artery in the brain is 0.45 m above the heart, what is the pressure in the artery? Ignore pressure changes due to blood flow.
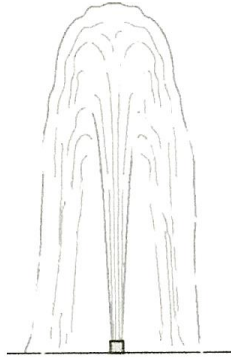
(10 points)

A fountain with an opening of radius 0.015 m shoots a stream of water vertically from ground level at 6.0 m/s The density of water is 1000 kg/m^3 .

(a) Calculate the volume rate of flow of water.

(b) The fountain is fed by a pipe that at one point has a radius of 0.025 m and is 2.5 m below the fountain's opening. Calculate the absolute pressure in the pipe at this point.

(c) The fountain owner wants to launch the water 4.0 m into the air with the same volume flow rate. A nozzle can be attached to change the size of the opening. Calculate the radius needed on this new nozzle.