Ch. 10 #35

The example they refer to is on Pg. 269 of your textbook, and the info that you need from that example is the stuff about blood flow in the aorta. So once you know the radius of the aorta is approximately 1.2cm, and that the blood's flow speed in the aorta is 40cm/s, it shouldn't be too tough to apply continuity ideas to this problem.

Ch. 10 #39

Before you begin, don't forget to convert the diameter from inches into centimeters (and then to meters). There are conversion factors at the front of your textbook.

Ch. 10 #41

You need to begin by solving a system of equations with two unknowns (v_1 and v_2). The two equations are the continuity equation and Bernoulli's equation. When you solve for v_1 you should get 1.985m/s.

Then remember that the problem asked for volume flow rate, so go back and calculate A_1v_1 to get the final answer.

Ch. 10 #42

The phrase 'pressure head' just means the difference in heights between the two points. So this can be solved with Bernoulli's equation, where one side includes a ρgy term (for the up-high location), and the other side includes a $\frac{1}{2}\rho v^2$ term (for the location where the water is exiting the faucet.

- Continued on next page -

Ch. 10 #42 (cont.)

In your Bernoulli's equations, assume that the system is open to the atmosphere on both ends, so this causes the pressure terms on each side to 'drop out'.

After you solve for v, remember that the problem asked for volume flow rate.

Ch. 10 #43

This is a Bernoulli's situation where the roof is flat, so y_1 (outside) = y_2 (inside), at least approximately. As far as the pressure terms, you don't know either of them. But since you're eventually solving for net force on the roof, the individual pressures don't matter as much as the *difference* between the two pressures. Solve for $P_2 - P_1$, and then use that difference in the $P=F/A$ formula.

Ch. 10 #44

Assume that the height difference between the top and bottom of the wing is negligible. Then, you can't calculate the pressure on either side of the wing, but you can calculate the pressure *difference* between the top and bottom to be 29,089.5Pa. Then use this to find the net force acting on the wing.

Ch. 10 #45

Use Bernoulli's equation, where your two locations are outside the hurricane (atmospheric pressure with zero motion at a certain height) and inside the hurricane (unknown pressure with motion at the same height).

Also, the answer on the answer sheet is based on $P_o = 1.013 \times 10^5$ Pa. If you use our regular value, you get 96,521 Pa.

Ch. 10 #46

The answer on the answer sheet is based on $P_o = 1.013 \times 10^5$ Pa. If you use our regular value, you get 2.051×10^5 Pa.

(P.S. Don't forget to convert atm to Pa.)

Ch. 10 #49a

1. Solve Bernoulli's equation for the speed at which the water leaves the hole. You should get $v_1 = \sqrt{2g(h_2 - h_1)}$
2. Now solve the vertical portion of a projectile problem to see how much time it takes the water to reach the ground from the height of the hole.
3. Finish with the horizontal portion of a projectile problem, to find range.

Ch. 10 #68

Do part A with Pascal’s principle, but you may then omit the other parts.