Colby Watts Test 2 Reflection

1. The test demonstrates open channel flow, forces due to static fluids, buoyancy, and stability, drag and lift, and flow measurement as well as water hammer and cavitation.
2. For part A problem 1, I calculated for force on the flange using $F=\gamma h+P2$, which is not correct since I need to calculate for hc and then multiply that in the equation. My force was almost correct but instead of using area of the pipe I calculated for area of the flange. I also never calculated for location since I assumed the location of the flange was directly across the piping system 18 ft down from the surface of the tank which I got correct. For number 2 my Rx and Ry were both wrong because I never calculated for a new pressure, and I also used the $Rx = \rho QV + P1A1$ and $Ry = \rho QV + P2A2$. Which is not the correct equation. Then for problem 3 my answer was almost correct and is off by 46.94 lb/ft2. I also included the wrong units in my solution. I had the correct equation but somewhere it got messed up when solving for the change in pressure. Then for problem 4 I never calculated for cavitation and left it blank because I did not have enough time.
   For Part B problem 1 we had to design a lazy river. I assumed to have my lazy river 2ft deep, but I did not calculate for it. For the Flow rate of the lazy river, I used the Q equation but instead of 1/n I used 1.49/n. I also calculated for R which I got correct if I would have calculated for meters instead of ft. My wetted perimeter is also different. My Q value is completely off due to me getting the wrong values for everything else. For problem 2 of Part B I used the correct velocity equation but my Cd value is different because I used the one in the book, but my answer was close to the actual answer. Then for problem 3 I got wrong because I kind of made up my own equation from other equations I found in the book. I also never calculated if the tube was stable or not.

3. What my grade should be.

1.	Purpose	0.5/10.0 out of 0.5/10.0
2.	Drawings	1.0/10.0 out of 1.0/10.0
3.	Sources	1.0/10.0 out of 1.0/10.0
4.	Design considerations	1.0/10.0 out of 1.0/10.0
5.	Data and variables	0.5/10.0 out of 0.5/10.0
6.	Procedure	2.0/10.0 out of 2.0/10.0
7.	Calculations	2.0/10.0 out of 2.0/10.0
8.	Summary	0.5/10.0 out of 0.5/10.0
9.	Materials	0.5/10.0 out of 0.5/10.0
10.	Analysis	1.0/10.0 out of 1.0/10.0
	TOTAL	**10.0/10.0** out of 10.0/10.0

1. Force on the flange
   a. Consider piezometric head (get pressure above fluid) 1/25 out of 1/25

b. Force magnitude 1/25 out of 1/25
c. Force location 1/25 out of 1/25

2. Pipe-elbow forces
   a. Free body diagram and correct forces 1/25 out of 1/25
   b. Force in x – solve for Rx 1/25 out of 1/25
   c. Force in y (weight) – solve for Ry 1/25 out of 1/25
3. Flow-nozzle flowmeter pressure drop
   a. Right equation and A1/A2 1/25 out of 1/25
   b. C value 1/25 out of 1/25
4. Water hammer pressure increase and cavitation
   a. Wave velocity (units?) 0/25 out of 1/25
   b. Pressure increase and Pmax 0/25 out of 1/25
   c. Pipe thickness 0/25 out of 1/25
   d. Lowest pressure & compare to sat pressure (cavit) 0/25 out of 1/25
5. Flow in the open channel
   a. Lazy river dimensions 1/25 out of 1/25
   b. Correct equation 1/25 out of 1/25
   c. Area and hydraulic radius 1/25 out of 1/25
6. Drag force on the child
   a. Correct equation to use 1/25 out of 1/25
   b. Correct area and velocity .5/25 out of 1/25
   c. How Cd was obtained? .3/25 out of 1/25
7. Lazy river tube floating – stability
   a. Realize Fb=W and solve for distance into water 0/25 out of 1/25
   b. Compute metacenter location 0/25 out of 1/25
   c. Realize metacenter will always be above cg 0/25 out of 1/25

8. Correct results? 12.8/25 out of 4/25

FINAL GRADE:

If getting everything right:

10 + (80)*(12.8/25) = 50.96

4. Discuss the following:
   a. The issues I encountered when completing the test was definitely getting confused on where to acquire information and jumping back and forth between the book appendix, book chapter as well as notes. To trouble shoot these problems I just stayed calm and tried not to jump around so much. I also have a whiteboard so that helps me out a lot in keeping information organized.
   b. I would take longer time on the test and not just three days. It is hard though because there is a lot of other things going on in my life and can only get to certain things at certain times.

c. I learned about the metacenter always being above cg, I also learned about designing a lazy river is hard as well as computing a flange.
d. One example is in the design of water parks because these are real world applications.
e. These concepts are used when building waterparks or designing a tank with a blind flange or putting a blind flange anywhere.
f. I believe anything I learn is important for my professional career.
g. I would use this skill when designing a lazy river or any open channel body of water as well as closing the end of a pipeline or creating a pressure seal or as well as reducing pressure with a flow nozzle orifice plate.
h. I have not applied anything but hopefully this summer I will with my engineering internship.
i. I felt most successful in doing the lazy river problem and felt comfortable in I would get all my points from that part of the test.
j. I am not entirely sure if the concepts used in this test will correlate to what I want to do as an engineer.
k. I spent at least 36hrs on the test. My time was organized somewhat well in finishing parts of the test that I needed that I thought were easier, and then try and tackle the harder problems. The last couple hours before the test submission time I was solving for flow nozzle but then ran out of time to calculate for cavitation. I would definitely not spend so much time on figuring out if my answer makes sense or not. I did a lot of recalculations due to me thinking my answers were not realistic.