## Test 3 Fluids Reflection

1) Test 3 demonstrated multiple course objectives, such as 4, 6, and 7. We used 4 when applying Bernuolli's to find the minor losses, the pump power, and the pressure at the outlet of the pump. We used objective 6 to complete the whole first problem and second. Lastly, 7 was applied to the second and third problem to apply to practical solutions.

2) After comparing my test 3 to the solutions posted on canvas, my work closely followed the professors' work when finding the new velocity and recalculating the minor losses for question one. For the redesign, our iteration process was derived by our Bernuolli's equation and did not look exactly like the solution. Although, our answers come out to be the same pipe and diameter and the same HP. For the second part, the forces acting on the discharge pipe were drawn correctly and Ry was calculated correctly, but Rx was a greater number than it should have been due to the unknown height of the inlet to the tank. Lastly, the pump selection was run correctly, but the pump chosen was based on our data, which was not identical to the professors. This yielded us a different pump but the procedure and information is correct for the pump we chose.

3)

I. Pipeline redesign Recalculate the new pump power including minor losses 1/8

- Use Bernoulli's to get ha (ref & points in pict.)
- Include all minor losses
- Correct results

II. Increase of pump power with new required flow rate 3/8

• Recalculate velocity

•	Included	all	minor	losses?
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• Correct results

III. New pipe diameter with same original pump		
• Included all minor losses?		
• Wrote full equation with diameter as unknown		
• Iteration process		
• Correct results		
2. Pipe-elbow forces		
Correct control volume and points	1/8	
Free body diagram and correct forces	1/8	
Force in x – solve for Rx (need to use Bernoulli's)	2/8	
Force in y (weight) – solve for Ry	2/8	
Correct results	0.5/8	
3. Pump preselection		

Why kinetic pumps?0.5/6

Use a pump map?1/6Draw desired operating point in pump curves1/6Pump suction, discharge size, and impeller sizes1/6Pump power, efficiency, size, and weight1/6

0/6

Correct results

 $(90/2)^{*}(7/8) + (90/4)^{*}(6.5/8 + 4.5/6) = 75\%$ 

4A. Some issues I ran into during the test were the wording in the test. It was confusing to refer back to test 2, for some questions but not others. Also, how the efficiency was read on the charts. We asked the professor and other students for clarification.

B. Elson and I started the test Friday afternoon, and we worked on completing the first problem. We then worked the next day on the other two problems. Monday, we revised all the work and made our final conclusions and our write-up. I would not change anything because the test was done to my satisfaction and on time.

C. I have learned more about the forces acting on pipes in a system. Also, how to pick a proper pump with certain parameters.

D. In a mechanical engineering career, we will encounter systems involving fluids, pumps, natural channels, and elevation differences, where we'll need to apply the concepts we're I am learning now.

E. In my first professional engineering career, I will be using all these concepts to apply to real-world situations to fix, design, or maintain fluid systems.

F. Yes, for my first professional career these concepts and skills I am learning in this course will be very useful.

G. If asked at my future job to design a pump system to move water up a building to the 10th floor, I will be able to apply the concepts of fluid flow that I learned in this course to complete that task.

H. The only course I have used this information for is the lab for fluid mechanics. This is helpful because it reinforces the material and concepts that were presented in lecture.I. I think I was most successful when I completely understood what I was looking for and how to obtain that through the equations. Also, my time management was great for this test,

which improved from test 1.

J. Whenever working in the industry with fluids moving or stagnant, I will be able to apply material we learned in class to those applications.

k. I spent about 3 days on this test. The first day was Friday, we worked on completing the whole first problem and comprehending the rest of the test. The second day was Sunday and we worked separately on the second and third question and tried to complete as much as possible. Monday was the due date so we worked on finalizing all the answers and work and completed the write-up. I would not do much differently, these were the only times our schedules aligned and we got everything done.