Test 1 demonstrated work toward several of the course objectives. For one we had to show an intuitive understanding of thermodynamics by using what we learned in class, and applying that knowledge to the test problems. We also had to think critically and in depth about what we had learned to apply it in slightly different situations like those presented on the test. In the first problem we also had to apply thermodynamics laws to gas turbine engines using ideal, reheating regeneration, and intercooling cycles (all of which were part of the system). In the second problem thermodynamics laws were applied to jet propulsion engines using ideal cycles. Throughout the entire test ideal internal combustion cycles using air as the working fluid were analyzed.

Problem 1:

Most of my first problem lined up with the provided solution. It was easy enough to calculate the effectiveness of the heat exchanger in the original problem using the states that were obtained in class. I simply had to decide which states to pull values from and plug them into the equation. The first mistake I made was when calculating for T_5. Instead of using the more accurate method presented in the solution, I used a formula from a homework problem to get the enthalpy of state 6, and use that to back out the temperature for that state and then use that temperature to solve for the temperature at state 5. Further, I did not recognize that because that temperature was lower than at state 4 the regenerator should not be used. My next major mistake came when calculating for mass flow rate, which I planned to use for calculating power. I did not use the correct value for net work that we had obtained in class, and instead calculated a new value based on my erroneous set up of the system. For that reason my value for new work was half of the correct value, which subsequently doubled my value for mass flow rate as well as power after that. I also should have included a summary of the results before the analysis to further explain my solution. I would advise myself to trust my gut and the material we learned, as well as going through the rubric for the technical writing portion of the exam.

Problem 2:

The first mistake I made when solving problem two was neglecting to factor in the actual states coming out of the compressor and turbine. I missed this portion of the question on the test and my understanding of the material was not so in depth that I realized these two states were needed for accurate calculations. I then used the efficiencies of the turbine and compressor to calculate pressure ratios incorrectly. This resulted in my values for the pressures to be significantly higher than they actually were, and subsequent calculations using these values were thrown off. I also neglected to include a summary of the results before the analysis. I would advise myself to study the material more in depth before and during the test before going out on a limb to make use of values found and to understand the requirements for the technical writing section better.

Writing Rubric	
Purpose	.45/10
Drawings	.95/10
Sources	1.0/10
Design Considerations	.8/10
Data and Variables	.5/10
Procedure	1.7/10
Calculations	1.4/10
Summary	0.0/10
Materials	.5/10
Analysis	.7/10
Total	**8/10**

Problem 1	
P-v T-s Diagrams	2/11
HX effectiveness (previous problem)	1/11
State Calculations (with regen)	1.8/11
Realize that Regen Hurts	0/11
State Calculations (no regen)	1.2/11
Power	.7/11
Final Results	.8/11
Total	**7.5/11**

Problem 2	
P-v T-s Diagrams	1.5/8
State Calculations	2.5/8
Propulsion Efficiency	.7/8
Final Results	.6/8
Total	**5.3/8**

Based on the state of my test I would say an appropriate grade for my work would be around a 62 (using the formula provided). I would say My initial set up of the problems and general method to the solutions was solid enough but I believe silly mistakes and lack of familiarity with some of the material caused my actual completed values to suffer. I also think my mistakes in regards to the technical writing portion (lack of summary and specifics in report of data) would bring my grade down a decent amount.

I did not run into too many issues during the test. The only major one that I could think of would be not knowing how to apply the values for efficiencies of the compressor and turbine in the second problem. I tried to remedy this problem the best I could by looking at the formulas for these values and doing my best to back out meaningful information. To complete the whole test I sat down and looked over the problems and briefly took a look at the writing rubric. I then used methods used in class on each problem and arrived at my solutions. The only thing I would change about my steps to complete the test would be taking more time to thoroughly read each question and go through the rubric to fully understand what I was getting into. I have learned more about the workings of gas turbine systems and how to analyze them when certain portions of them are turned off and how that may affect the system as a whole, as well as how we have to change the system to best suit the circumstances. I have also learned more about the jet propulsion cycle and how to use arbitrary information given to obtain meaningful values. Engineers may use these concepts to improve the systems they design to increase effectiveness and get the most use out of energy in the system. For example if they know that the reheater in the system is turned off, they should probably check if it's worth having the regenerator on, and if not they should reroute the working fluid so as to not lose any energy. Further, if engineers can calculate the effects of having a higher efficiency turbine or compressor in a jet engine they can see which would best improve the functionality of their product. I think I will be using everything I have learned in this class, future classes, and perhaps in industry after college. I think it is important to learn the foundations of the engineering we do so that we can do our job well and also so that we can have the background knowledge to know whether or not what we are calculating and designing makes sense. I may use the skills I learn from this class in my job after college to design parts or whole systems that are as efficient as they can be. I have been able to use the base knowledge I have obtained through this course to my job in HVAC to understand the science behind systems we put into houses and how the units do their job and how they can be improved. I feel that I was most successful in the set up and some of the initial steps of these problems and was able to improve on using knowledge from class to think critically about the problems we are given. I think that what I’m learning now could help me advance my position in the HVAC field or even allow me to transfer my skills outside of the job I have now into another field of engineering. I spent roughly 5-6 hours on this test. It was not organized and was done mostly in one sitting which was probably not the best way to tackle it.

Going back I would spend more time on it and perhaps spread the test out across a couple days to give myself ample time to consider the questions and draw on what we learned in class.