Today we learned a few things. The first thing we learned was during the lab when we were setting up a circuit and comparing the measured results to the theoretical thevenin equivalents was that some of the resistors in the lab actually have a margin of error of 10% which is enough to significantly impact the accuracy of our measurement. We were getting a value much lower than 4.57 and then all of a sudden when we switched out our 6.8k resister we were getting .6% error.

The main aha moment we had today was realizing that the way we could maximise the power to the load would be to make the resistance of the load match the resistance of the circuit. We also derived this theoretically on paper by differentiating the expression for the power received by the load and setting it equal to 0 P=V^2/(R+RL). P'=0 and solving for RL gives RL=R. This means that you can always strategically make the resistance of your load as close as possible to the resistance of the rest of the circuit if you wanted to maximise the power. We confirmed this when we found the maximum power theorem on an engineering website that told us that this is always the case, whether the circuit is ac or dc.

Citation:

12.5: Maximum Power Transfer Theorem - Engineering Libretexts, eng.libretexts.org/Courses/Canada_College/Circuits_and_Devices/12:_AC_Circuit_Analysis_Theorems_and_Techniques/12.05:_Maximum_Power_Transfer_Theorem. Accessed 26 Feb. 2025.