ASTR368
HW#8
March 29, 2024
Due April 5, 2024
2 points each part unless otherwise stated

1) What is inflation and what two main problems does it solve?

2) What was the temperature of the universe at $z = 1, 2$, and at recombination? Be sure to state any and all assumptions.

3) Use equations to convince me of limits on the dark energy equation of state parameter w for a "Big Rip."

4) Walk me through the logic of the supernova experiment. If the SNe they measure are fainter than expected for constant expansion, what does that imply and why? How about for brighter than expected?

5) a) Use Equations 29.120, 29.121, and 29.122 to derive an expression for the total density parameter Ω as a function of z.
b) Use this expression to explain why the early Universe was radiation dominated, then matter dominated, then dark energy dominated.