Exercise 3

Total Points = (10.25/20). Feel free to clarify things with me (via email/in person)

Question 1 : Operators

You missed a factor of 2 in your energy, also you were supposed to write $\epsilon[\phi]$ instead of just leaving it at $\langle\epsilon\rangle$. **(0.5/1)**

Question 2 : Equations of Motion

Correct **(1/1)**

Question 3 : Leapfrog Convergence

You do not see convergence because you messed up the order of your function arguments. **(1/3)**

Question 4 : Code

1. For the leapfrog convergence. you missed a factor of N in your hamiltonian, but the issue was caused by you messing up the order of the arguments in the function for the hamiltonian. (-1)

2. You messed up the order of the arguments of your Hamiltonian function again, in the HMC function, which caused your acceptance rate to be low, hence the bad output (-1)

3. You are supposed to sample the new momenta every time you sweep. (-1)

4. You missed a factor of 2 in the energy as well, which also caused your energy variation to be so off. (-0.25)

Be Careful, next time **(6.75/10)**

Question 5 : Plots

Both the plots are incorrect, and simulation results for multiple system sizes, which was missing. **(1/5)**