Exercises:
1. Prove that expectation of sum of random variables = sum of expectations [linearity of expectation, we do not need independence]
2. Prove that variance of sum of independent variables = sum of variances [here, we do need independence]
3. We spoke about two ways to estimate the value of an integral via Monte Carlo: (a) Enclosing by rectangle (b) Computing expectation. Do error analysis numerically, and find out which one is better. Also compute sig/sqrt(n) analytically and confirm the numerical findings.

A nice source to read on Monte Carlo methods:
https://artowen.su.domains/mc/

Questions on Prob:
1 - https://www.probabilitycourse.com/chapter11/11_2_7_solved_probs.php
Markov Chains :
2 - https://bookdown.org/jkang37/stochastic-process-lecture-notes/hw02.html

Beyond mid :

Some notebooks on numerical integration and Ito Lemma.
Task:
1. Play around with Integration wrt Brownian Motion. Is Left sum - Right sum always equal to T?
2. We motivated why sum(Delta B^2) goes to sum (Delta t). Check this numerically as well.
3. Geometric Brownian Motion solution -- Get the histogram numerically via Monte Carlo and compare with the derived closed form solution. Do they match ?

I would also suggest you to go through this youtube video:
https://youtu.be/A5w-dEgIU1M?si=15pWE5RJdJYoWgWa

Some solved problems on Brownian Motion and Ito Lemma:
https://www.math.drexel.edu/~song/Gene%20Golub%20Summer%20School/Song/Exercise%202.pdf
https://math.nyu.edu/~goodman/teaching/StochCalc2018/notes/Lesson4.pdf
https://uregina.ca/~kozdron/Teaching/Regina/441Fall14/Notes/L28-Nov10.pdf