

1 Homework 07

You will find all the problems for this homework in this document. You are responsible for uploading a pdf document with all of your results and the necessary work to the Canvas shell for the class. Please make sure that your homework pdf is legible, clear, and pledged.

1. For a random walk where the probability of getting a heads is $p > \frac{1}{2}$, express the following:
 - (a) $\mathbb{E}[M(4)|\mathcal{F}(2)]$
 - (b) $\mathbb{E}[M(3)|\mathcal{F}(2)]$
 - (c) $\mathbb{E}[2M(4) - 3M(3)|\mathcal{F}(2)]$
2. For a symmetric random walk $M(t)$, define a process $X(t) = e^{M(t)}$. Express the following:
 - (a) $\mathbb{E}[\frac{X(4)}{X(3)}|\mathcal{F}(3)]$
 - (b) $\mathbb{E}[X(3)|\mathcal{F}(1)]$
 - (c) $\mathbb{E}[X(2)X(1)|\mathcal{F}(1)]$
3. For a simple random walk with probability of getting a heads on any toss being $\frac{1}{3}$ and $N = 5$,
 - (a) Express the random variable τ_{-2}
 - (b) What is $\mathbb{P}(\tau_{-2} < 4)$?
 - (c) What is $\mathbb{P}(\tau_{-2} \leq 4)$?