2WB08 Stochastic processes

Problem set 7

- **From the book:** Exercise 3.1, 3.3, 3.4, 3.11
- **Problem 1:** A dice is rolled until the total sum of the spots exceeds 1000. What is the expected number of rolls approximately?
- **Problem 2:** Playing the game of Problem 1, a player wins 100 Euros if less than 270 rolls are needed, otherwise he has to pay 5 Euros. Calculate the expected winnings of the player (Hint: use Theorem 3.3.5.).
- **Problem 3:** For a renewal process let $\phi(s) = E\left[e^{-sX_1}\right] = \int_0^\infty e^{-sx}\ dF(x)$ be the Laplace transform of X_1. Find the Laplace transform $\int_0^\infty e^{-sx}\ dm(x)$ of the renewal function $m(t)$.
- **Problem 4:** Can you find a Riemann integrable function $h : \mathbb{R} \to [0, \infty)$ with $\int_0^\infty h(u)\ du < \infty$, which is not directly Riemann integrable?