MH2500 Mini-Quiz

Question 1

Each game you play is a win with probability p . You plan to play 5 games, but if you win the fifth game, then you will keep on playing until you lose. Find the expected number of games that you lose.

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Question 2

Ten balls are to be distributed among 5 urns, with each ball going into urn i with probability p_i, where $\sum_{i=1}^{5} p_i = 1$. Let X_i denote the number of balls that go into urn i.
Assume that events corresponding to the locations of different balls are independent. Find $P(X_1 + X_2 + X_3 = 7)$.

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Question 3

Let X be a random variable such that $a \leq X \leq b$. Use the definition of expectation to prove that $a \leq \mathbb{E}(X) \leq b$.