

S1. Suppose trials, each having a probability p of being a success, are performed until k success occur. What is the probability that n trials are performed?

S2. On any given day, there are n customers in the market. Out of these customers, a customer enters BHV store with probability p , and then buys strawberries with probability q . What is the probability that k customers buy strawberries from BHV on a given day?

S3. A European call option gives you the right but not the obligation to buy a stock for a price K dollars (called the strike price) at time T (called the exercise time). Speculating that the stock price will rise significantly, you paid a premium of C dollars today (at time 0) to buy the call option (think of this as buying a lottery ticket). Suppose the stock price at time T , S , is a random variable with pdf $f_S(s)$. What is your expected payoff from the call option?

S4. Two players take turns shooting at a target, with each shot by player i hitting the target with probability p_i , $i = 1, 2$. Shooting ends when one of the players hits the target. Let $E[X_i]$ be the expected number of shots taken when player i , $i = 1, 2$, shoots first.

- (a) Find $E[X_1]$ as a function of $E[X_2]$.
- (b) Find $E[X_1]$ and $E[X_2]$.