Review 1

1. We have a box with 10 blue balls and 5 red balls.
   (a) We choose 5 balls at random. What is the probability that among them are 3 blue balls and 2 red balls?
   (b) Assuming that the blue balls are indistinguishable and that the red balls are indistinguishable, in how many different ways can we arrange these 10 blue balls and 5 red balls in a row?
   (c) In how many ways can we arrange these 10 blue balls and 5 red balls in a row so that no two red balls are next to each other?

2. We toss a fair coin 50 times and record the result by a trajectory. What is the conditional probability that starting with the first toss the trajectory stays all the way above the x-axis, given that the total number of heads was 30?

3. A box has 15 red and blue balls. Pick a ball at random, note its color and put it back together with an additional ball of the same color. Then pick a ball again. How many blue balls are in the box if the ball we pick the second time is blue with probability 1/3?

4. Assume the random walk hypothesis for the stock market. You invest $1,000. Which of the two scenarios below is more likely?
   (a) After $2n$ days you have as much money as when you started.
   (b) Your stock trades either higher on all $2n$ days or lower on all $2n$ days.

5. Again assume the random walk hypothesis for the stock market. Suppose you invest $100 in Apple and $100 in Google. Every day you either invest one more dollar in Apple or in Microsoft or sell stock for $1 in either company. How likely is it that both stocks are worth $100 after 100 days?