Assignment 5

1. A local soccer team has 5 more games that it will play. If it wins its game this weekend, then it will play its final 4 games in the upper bracket of its league, and if it loses, then it will play its final games in the lower bracket. If it plays in the upper bracket, then it will independently win each of its games in this bracket with probability 0.4, and if it plays in the lower bracket, then it will independently win each of its games with probability 0.7. If the probability that it wins its game this weekend is 0.5, what is the probability that it wins at least 3 of its final 4 games.
2. On average, 5.2 hurricanes hit a certain region in a year. What is the probability that there will be 3 or fewer hurricanes hitting this year?
3. A government task force suspects that some manufacturing companies are in violation of federal pollution regulations with regard to dumping a certain type of product. Twenty firms are under suspicion but all can not be inspected. Suppose that 3 of the firms are in violation.
    a) What is the probability that inspection of 5 firms finds no violations?
    b) What is the probability that the plan above will find two violations?
4. A restaurant chef prepares a tossed salad containing, on average, 5 vegetables. Find the probability that the salad contains more than 5 vegetables
    a) on a given day;
    b) on 3 of the next 4 days;
    c) for the first time in December on December 5.
5. Suppose that, on average, 1 person in 1000 makes a numerical error in preparing his or her income tax return. If 10000 forms are selected at random and examined, find the probability that 6,7, or 8 of the forms contain an error.
6. A interviewer is given a list of potential people he can interview. If the interviewer needs to interview 5 people and if each person (independently) agrees to be interviewed with probability $\frac{2}{3}$, what is the probability that his list of potential people will enable him to obtain his necessary number of interviews if the list consists of
    a) 5 people
    b) 8 people?

    what is the probability that the interviewer will speak to exactly
    c) 6 people?
    d) 7 people on the list?

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