機率學小考 2015.03.11 每題 20 分。作答要寫過程。

1. Consider the experiment of rolling a pair of 6-sided dice. We assume the dice are fair, meaning that each of the 36 possible outcomes has the same probability of 1/36. Calculate the probability of the following events.
   - the first roll is greater than the second roll.
   - the sum of the rolls is a prime number.
2. A conservative design team C and an innovative design team N are asked to separately design a new product within a month. From past experience we know that
   - Team C is successful with probability 1/3.
   - Team N is successful with probability 1/2.
   - At least one team is successful with probability 2/3.

   Assuming that exactly one team is successful, what is the probability that it is team N?
3. Three cards are drawn from an ordinary 52-card deck without replacement. What is the probability that the second card is a diamond and the others are not diamonds?
4. 阿泰到機場可以選擇搭公交車、捷運、計程車，三種選擇的機率分別爲 $0.2, 0.5, 0.3$，趕到的機率分別爲 $0.3, 0.8, 0.7$。
   - 阿泰趕到機場的機率爲何？
   - 若阿泰沒有趕到機場，則他搭了捷運的機率爲何？
5. Alice is taking a probability class. At the end of each week, she is either up-to-date or fallen-behind. If she is up-to-date in a week, she will be up-to-date the next week with probability 0.7. If she is fallen-behind in a week, she will be fallen-behind the next week with probability 0.5. What is the probability that she is up-to-date after 4 weeks?