5:

Out of the students in a class, 60% are geniuses, 70% love chocolate, and 40% fall into both categories. Determine the probability that a randomly selected student is neither a genius nor a chocolate lover.

G = 6/10

C = 7/10

B = 4/10

*!G = 4/10*

*!C = 3/10*

*C and !G = C - B = 3/10*

*G and !C = G - B = 2/10*

*C and !G + G and !C + B = 9/10*

*The inverse of above is 1/10.* ***The probability of being a "neither" is 10%.***

6:

A six-sided die is loaded in a way that each even face is twice as likely as each odd face. All even faces are equally likely, as are all odd faces. Construct a probabilistic model for a single roll of this die and find the probability that the outcome is less than 4.

*P(2 or 4 or 6) = 66.6%*

*P(1 or 3 or 5) = 33.3%*

*The probability for any given odd is 11.1%; 22.2% for any given even.* ***P(1) + P(2) + P(3) = 44.4%***

8:

You enter a special kind of chess tournament, in which you play one game with each of three opponents, but you get to choose the order in which you play your opponents, knowing the probability of a win against each. You win the tournament if you win two games in a row, and you want to maximize the probability of winning. Show that it is optimal to play the weakest opponent second, and that the order of the other two opponents does not matter.

*There are three games to win. By putting the weakest opponent second (in the middle), you'll face the order strong-weak-strong.* ***In case you fail against opponent one, and you beat opponent two, then you get one more opportunity to win. Putting the strongest first or last doesn't change the prior fact or your likelihood of losing against the middle-strength player.***

12:

We are given three coins: one has heads in both faces, the second has tails in both faces, and the third has a head in one face and a tail in the other. We choose a coin at random, toss it, and the result is heads. What is the probability that the opposite face is tails?

***See attached .py file***

