1. Alina makes two independent flips of a fair coin.
   
   (a) The first flip came up heads. What is the probability that the second flip came up heads?
   
   (b) The second flip came up heads. What is the probability that the first flip came up tails?
   
   (c) One of the flips came up heads. What is the probability that the other flip came up heads?

2. Suppose we toss two fair dice. Let $E_1$ denote the event that the sum of the dice is six, $E_2$ denote the event that the sum of the dice is seven, and $F$ denote the event that the first die equals four.
   
   (a) Is $E_1$ independent of $F$?
   
   (b) Is $E_2$ independent of $F$?

3. Prove or disprove: If events $A$, $B$, and $C$ are such that $\Pr(A) \Pr(B) \Pr(C) = \Pr(A \cap B \cap C)$, then the events are pairwise independent.

4. Suppose there are two bowls of candy. The first bowl has 10 Skittles and 30 M&Ms, and the second bowl has 20 of each. Steve picks a bowl uniformly at random, then takes a random candy from that bowl, which turns out to be an M&M. What is the probability that Steve picked the first bowl?

5. Sam has two bowls of M&Ms, one large and one small. The large bowl has 230 M&Ms with the following distribution: 30% brown, 20% yellow, 20% red, 10% green, and 20% orange. The small bowl has 80 M&Ms with the following distribution: 24% blue, 20% green, 16% orange, 14% yellow, 13% red, and 13% brown.
   
   Sam randomly picks an M&M from each bowl, and gives them to you without telling you which bowl they came from. One M&M is yellow and the other is green. What is the probability that the yellow M&M came from the large bowl?
   
   [Hint: As you might suspect, much of the information given about the bowls is unnecessary. What parts are important?]