1. Show that if $E$ and $F$ are independent events, then $\overline{E}$ and $\overline{F}$ are also independent.

2. Find the smallest number of people you need to choose at random so that the probability that at least one of them has a birthday today exceeds $1/2$.

3. Assume that the probability a child is a boy is 0.51 and that the sexes of children born into a family are independent. What is the probability that a family of five children has
   a) exactly three boys?
   b) at least one boy?
   c) at least one girl?
   d) all children of the same sex?

4. A coin is biased so that the probability a head comes up when it is flipped is 0.6. What is the expected number of heads that come up when it is flipped 10 times?

5. Suppose that we flip a coin until either it comes up tails twice or we have flipped it six times. What is the expected number of times we flip the coin?

6. Suppose that we roll a die until a 6 comes up.
   a) What is the probability that we roll the die $n$ times?
   b) What is the expected number of times we roll the die?