1. In how many ways can two aces and three kings be selected from a standard deck of cards if cards are drawn without replacement?

2. In how many ways can four red and five black cards be selected from a standard deck of cards if cards are drawn without replacement?

3. Expand the following binomials.
   (a) \((x + y)^5\)
   (b) \((2x - 3y)^5\)

4. Paula, Sincy, Gloria, and Jenny have dinner at a round table. In how many ways can they sit around the table if Cindy wants to sit to the left of Paula?

5. Determine the sample space for each random experiment.
   (a) An urn contains five galls numbered 1-5, respectively. The random experiment consists of selecting two balls simultaneously without replacement.
   (b) Roll a fair die twice in a row.

6. (a) Assume that \(P(A) = 0.4\), \(P(B) = 0.4\), and \(P(A \cup B) = 0.7\). Find \(P(A \cap B)\) and \(P(A^c \cap B^c)\).
   (b) Assume that \(P(A \cap B) = 0.1\), \(P(A) = 0.4\), and \(P(A^c \cap B^c) = 0.2\). Find \(P(B)\).

7. If \(A \subset B\), we define the difference between \(A\) and \(B\), denoted by \(B - A\),

\[
B - A = B \cap A^c.
\]

Show that \(P(B - A) = P(B) - P(A)\).

8. Find the probability of exactly two heads if toss four fair coins.

9. Roll two fair dice, one after the other, find the probability that the first number is larger than the second number.

10. If a woman with normal vision who carries the color blindness gene on one of her \(X\) chromosomes has a child with a man who has normal vision, what is the probability that their child will be color blind?

11. How many consecutive zeros are there at the end of 50 factorial? What about 200 factorial?