1. Roll three (6-sided) dice. Let $X$ denote the number of 2’s that appear.
   1a. Find $P(X = 0)$. 1b. Find $P(X = 1)$. 1c. Find $P(X = 2)$. 1d. Find $P(X = 3)$.

2. Suppose that a drawer contains 8 marbles: 2 are red, 2 are blue, 2 are green, and 2 are yellow. The marbles are rolling around in a drawer, so that all possibilities are equally likely when they are drawn. Alice chooses 2 marbles without replacement, and then Bob chooses 2 marbles. Let $X$ denote the number of red marbles that are chosen altogether (if Alice and Bob put their collected marbles together after picking).
   2a. Find $P(X = 0)$. 2b. Find $P(X = 1)$. 2c. Find $P(X = 2)$.

3. Suppose Alice rolls a 6-sided die, and Bob rolls a 4-sided die. Let $X$ denote the minimum value on the two dice.
   3a. Find $P(X = 1)$. 3b. Find $P(X = 2)$. 3c. Find $P(X = 3)$. 3d. Find $P(X = 4)$.

4. Suppose Alice rolls a 6-sided die, and Bob rolls a 4-sided die. Let $X$ denote the maximum value on the two dice.
   4a. Find $P(X = 1)$. 4b. Find $P(X = 2)$. 4c. Find $P(X = 3)$. 4d. Find $P(X = 4)$. 4e. Find $P(X = 5)$. 4f. Find $P(X = 6)$.

5. Suppose that a box contains 10 balls. At the start, 3 are white and 7 are blue. Whenever a ball is selected from the box, a layer of blue paint is applied to it, so blue balls stay blue, and white balls become blue; afterward, the ball is returned to the box, so that 10 balls are always in the box.
   Perform two rounds of the game. Let $X$ denote the number of blue balls after two rounds.
   5a. Find $P(X = 7)$. 5b. Find $P(X = 8)$. 5c. Find $P(X = 9)$.
   [Hint: Since there are either 7, 8, or 9 blue balls after two rounds of this game, then your three answers must sum to 1.]

6. Suppose that there are 3 red plates and 3 blue plates on a shelf. You randomly select 3 of them, with all choices equally likely. Let $X$ denote the number of blue plates selected.
   6a. Find $P(X = 0)$. 6b. Find $P(X = 1)$. 6c. Find $P(X = 2)$. 6d. Find $P(X = 3)$. 6e. Find $P(X = 4)$. 6f. Find $P(X = 5)$. 6g. Find $P(X = 6)$. 6h. Find $P(X = 7)$. 6i. Find $P(X = 8)$. 6j. Find $P(X = 9)$. 6k. Find $P(X = 10)$. 6l. Find $P(X = 11)$. 6m. Find $P(X = 12)$.