

STAT/MA 41600
In-Class Problem Set #7: September 10, 2014
(there is no Problem Set #6)

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 $P(X = 3)$.