

STAT/MA 41600
In-Class Problem Set #3: August 31, 2015

1. It is estimated that, of the people viewing a certain movie over the weekend, 45 percent were adult women, 42 percent were adult men, and 13 percent were children.

If we randomly interview people at a theatre about the movie, each interview takes a few minutes, so we will not interview people in the same group or family. So we may assume that their gender and age classification is independent from person to person.

1a. What is the probability that the first five people we interview are all adults?

1b. What is the probability that the first adult we interview is a female?

2. Suppose that we roll a pair of (6 sided) dice until the first value appears that is 7 or less, and then we stop afterwards.

2a. What is the probability that exactly three (pairs of) rolls are required?

2b. What is the probability that at least three (pairs of) rolls are needed?

2c. What is the probability that, on the last rolled pair, we get a result of exactly 7?

3. Suppose that 11% of albums sold are country music; 15% are pop; 17% are R&B; and 29% are rock. There are several other kinds of genres not listed here. Suppose that we talk to people about their music choices. (Assume that the people selected have independent music preferences.) If we continue talking to people until we find someone whose top music choice is one of the four genres above, what is the probability that this person prefers rock?

4. Consider a red 4-sided die (numbered 1, 2, 3, 4), a green 4-sided die (also 1 to 4), and a blue 6-sided die (1 to 6). Roll the three dice (simultaneously) until the *sum* of the three dice equals 5, and then stop afterwards.

4a. On this final role of the dice, what is the probability that the red and green dice have the same values?

4b. Is the solution the same if the dice do not have colors? I.e., suppose that we roll two 4-sided white dice and one 6-sided white die, until the *sum* of the three dice equals 5, and then stop afterwards. On this final role of the dice, what is the probability that the 4-sided dice have the same values?