

Due Thursday, March 7, beginning of class

Assigned Problems

- (3.5.16)** Two balls are drawn from an urn with balls numbered from 1 up to 10. What is the probability that the two numbers will differ by more ($>$) than 3?
- (3.5.17)** How can 5 black and 5 white balls be put into two urns to maximize the probability that a white ball is drawn when we draw from a randomly-chosen urn?
- (3.5.24)** John takes the bus with probability 0.3 and the subway with probability 0.7. He is late 40% of the time when he takes the bus, but only 20% of the time when he takes the subway. What is the probability he is late for work?
- (3.5.32)** Three people take turn shooting a basketball and have probabilities 0.2, 0.3, and 0.5 of scoring a basket. Compute the probabilities for each person to get the first basket if they each only shoot once.
- (3.5.39)** A cab was involved in a hit-and-run accident at night. Two cab companies with green and blue cars operate 85% and 15% of the cabs in the city, respectively. A witness identified the cab as blue. However, in a test, only 80% of witnesses were able to correctly identify a cab's color in night-time conditions like those at the accident. Given this, what is the probability that the cab involved in the accident was blue?
- (3.5.40)** A student goes to class on a snowy day with probability 0.4, but on a non-snowy day attends with probability 0.7. Suppose that 20% of the days in February are snowy. What is the probability that it snowed on February 7, given that this student was in class on that day?
- (3.5.50)** A particular football team is known to run 40% of its plays to the left and 60% to the right. When the play goes to the right, the right tackle shifts his stance 80% of the time, but does so only 10% of the time when the play goes to the left. As the team sets up for the play, the right tackle shifts his stance. What is the probability that the play will go to the right?
- (3.5.55)** In a certain city, 30% of the people are registered Republicans, 50% are Democrats, and 20% are Independent. In a given election, $2/3$ of registered Republicans voted, 80% of Democrats voted, and 50% of the Independents voted. If we pick a voter at random, what is the probability that they are a registered Democrat?
- (3.5.61)** Suppose we roll one die repeatedly and let N_i be the number of the roll on which the i first appears. Find the joint distribution of N_1 and N_6 .
- (3.5.64)** Fill in the rest of the joint distribution using the clues that $P(Y = 2|X = 0) = 1/4$ and that X and Y are independent. There is only one answer.

Y	$X = 0$	$X = 3$	$X = 6$
1	?	?	?
2	0.1	0.05	?

News Assignment 4

(This is the *not* same description as last week. Updates to the assignment have been bolded.)

Find a news article, popular science piece, or scientific article that discusses or applies some aspect of probability theory **that we have learned in Chapter 2 or 3**. This assignment is designed to provide structure for exploring the many ways in which probability is used in the world around us, and to help you prepare for finding a project topic of interest to you and your group members.

Prepare a typed, or neatly hand-written, summary of your chosen article. It should be between 1/2 and 1 page in length, and **to receive full credit**, it should contain the following components:

1. A citation for the article, in either MLA or APA format.
2. A 1-2 paragraph summary of the article contents, including the thesis and main argument. The idea here is for someone else in the class to be able to understand what the article was about without having to read it or have familiarity with subject matter that is not probability-related.
3. A 1 paragraph summary of how the article relates to a specific topic in our probability course. We don't need to have covered it yet, but it should either be a topic on the schedule, or an extension of a topic listed. If we haven't covered the probability topic yet, include a description of it in qualitative terms or in terminology that has been discussed in class.

Turn this summary in *separately* from the main homework assignment, since we will be discussing them in class.