

PROBLEM SET 4
Due Friday, February 16

Question 1

Problem 3.43 in Chapter 3, McClave, Benson and Sincich.

Question 2

Problem 3.50 in Chapter 3, McClave, Benson and Sincich.

Question 3

Problem 3.77 in Chapter 3, McClave, Benson and Sincich.

Question 4

Problem 3.81 in Chapter 3, McClave, Benson and Sincich.

Question 5

Problem 3.86 in Chapter 3, McClave, Benson and Sincich.

Question 6

Problem 3.87 in Chapter 3, McClave, Benson and Sincich.

Question 7

Hercule Poirot (a famous Belgian detective) has to solve a complicated murder case. A person has been poisoned in a Victorian mansion. Mr. Poirot knows that there are three groups of professional killers: those with blue eyes, those with pink eyes, and those with yellow eyes. The percentage of blue-eyed killers is 34% of the total, that of pink-eyed killers is 18%, and the rest is yellow-eyed. Mr. Poirot also knows that the chance that a blue-eyed killer uses poison as opposed to other murder weapons is .10; the same probability is .60 for a pink-eyed killer and only .02 for a yellow-eyed killer.

- Calculate the probability that the assassin in Mr. Poirot's case is a blue-eyed killer. Repeat the calculation for pink- and yellow-eyed killers. Is the assassin in this case more likely to have blue, pink, or yellow eyes?
- If another murder takes place and poison is not involved, what is the probability that the murder was committed by a yellow-eyed killer?

Question 8

Suppose Stefania has been set up by a friend for a blind date. She does not know anything about her date, except that he is Roman Catholic. She wants to try to figure out her date's nationality. For simplicity, suppose that in NYC there are only three nationalities: American, Russian, or Puerto-Rican. More specifically, NYC is 52 % American, 18 % Russian, and 30 % Puerto-Rican. In addition, Stefania has traveled the world and she knows that Catholics make up 30 % of all Americans, 80 % of all Puerto-Ricans, and 12 % of all Russians.

Using Bayes Rule, calculate the probability that Stefania's date is American, Russian or Puerto-Rican, given the information she has about the guy's religious affiliation.