

Homework 1

- Let $P(A) = 1/2$, $P(B) = 1/8$, and $P(C) = 1/4$, where A , B , and C are disjoint. Find the following:
 - $P(A \cup B \cup C)$.
 - $P(A^C \cap B^C \cap C^C)$.
- If $P(A) = \frac{1}{4}$ and $P(B^C) = \frac{1}{5}$, can A and B be disjoint? Explain. Find conditions for $P(B^C)$ such that A and B can be disjoint.
- Find an expression for $P(A \cup B \cup C)$ in terms of intersections similar to CB Theorem 1.2.9b.
- Prove that $P[(A \cap B^C) \cup (A^C \cap B)] = P(A) + P(B) - 2P(A \cap B)$.
- In the upcoming presidential election, assume that every voter has to either vote for Clinton or Trump (the ballot cannot be left blank and there are only two choices). Suppose 40% of Tennesseans vote for Clinton and further suppose that 30% of Tennesseans are African-American. What percentage of voters are African-Americans who voted for Trump?
- Provide the sample space for the following sets of studies:
 - A survey is designed to estimate the number of indigo buntings in Edwin Warner Park in September.
 - A cancer patient's time from initiation of chemotherapy to relapse/death from cancer is assessed.
 - Three people are randomly selected and their blood type (A, B, AB, or O) is determined (order doesn't matter).

Hint for question 5: Answer is an interval

Casella and Berger Book: 1.4, 1.6, 1.7, 1.8 (on c the Kolmogorov Axioms is the definition on top of pg 7), 1.16, 1.17, 1.18 (note that the balls in this problem are distinct so think of them as being labeled with numbers or letters), 1.20, 1.22 (Hint: distributed evenly means same number of days from each month)