

Bent E. Sørensen

ECONOMICS 6331 – Probability and Statistics, Fall 2004

Homework 2. Wednesday September 1, 2004. Due Monday September 13.

1. (From Midterm 1, Spring 2003, counted 24%) A study of college students finds that while 60 percent of college students are male, only 40 percent of college students with an A average are male. In contrast, 15 percent of female students have an A average. Assuming these results are accurate answer the following questions.

- a) Are “being a male student” and “having an A average” independent? Why?
- b) What is the probability that a randomly selected student has an A average?
- c) What is the probability that a randomly selected male student has an A average?

2. 1. Demonstrate that $P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$. (You may use a Venn diagram or use the rule for $P(A \cup B)$ and the associative law for unions of sets.)

3. (Question 2.3 in Ramanathan.) Let B be an event and A_1, A_2, \dots, A_n be n mutually exclusive events. Define $A = \bigcup_{i=1}^n A_i$. Also assume $P(A_i) > 0$ and $P(B|A_i) = p$ for all i . Show that $P(B|A)$ is also equal to p . [A Venn diagram might help.]

4. The probability that a person will watch a movie on TV is 0.80. If a person is watching, the probability that the show is taped is one-third. If a person is not watching, the probability that the show will be taped is 0.9. What is the probability that the show will be taped? What is the probability that a show is being watched given that it is being taped?