

PORTLAND STATE UNIVERSITY
Department of Mathematics & Statistics
FALL TERM 2009

STAT 451/551 Assignment #3 Due Wednesday, October 21
Professor Tableman

1. Suppose A and B are events with $P(A) = 1/4$, $P(B) = 1/3$, and $P(A \text{ or } B) = 1/2$. Find
 - (a) $P(A \text{ and } B)$
 - (b) $P(A \text{ and } B')$
 - (c) $P(A | B)$
 - (d) Are the events A and B mutually exclusive? Why or why not?
 - (e) Are A and B independent events? Why or why not?
2. A fair dime is tossed three times. Find the probability that
 - (a) all three tosses come up the same.
 - (b) at least one head comes up.
 - (c) a tail results on the second toss.
3. Suppose that $P(A) = .4$, $P(A | B) = .6$, and $P(B | A) = .3$.
 - (a) Find $P(A \text{ and } B)$.
 - (b) Find $P(B)$.
 - (c) Are the events A and B independent? Why or why not.
4. A research study concerning the relationship between smoking and heart disease in men over 50 years old led to finding that 10% of the men smoked and had experienced heart disease. Furthermore, it was known that 30% of the men in the study were smokers. If a man over 50 smokes, what is the probability that he is experiencing heart disease?
5. Exercise #91, p. 82 in your textbook.
6. Exercise #33, p. 66 in your textbook.
7. Exercise #34, p. 66 in your textbook.
8. Exercise #35, p. 66 in your textbook:

There is a page 2 to this assignment.

9. Three members of a private country club have been nominated for the office of president. The probability that Mr. Adams will be elected is 0.3, the probability that Mr. Brown will be elected is 0.5, and the probability that Mr. Cooper will be elected is 0.2. Should Mr. Adams be elected, the probability for an increase in membership fees is 0.8. Should Mr. Brown or Mr. Cooper be elected, the corresponding probabilities for an increase in fees are 0.1 and 0.4. If someone is considering joining the club but delays his decision for several weeks only to find that the fees have been increased, what is the probability that Mr. Cooper was elected president of the club?
10. Consider the two events A and B such that $P(A) = 1/3$ and $P(B) = 1/2$. **Under each of the following conditions** determine the value of $P(A' \text{ and } B)$:
- (a) A and B are disjoint (mutually exclusive). (Draw Venn diagram)

 - (b) A is a subset of B . (Draw Venn diagram)

 - (c) $P(A \text{ and } B) = \frac{1}{8}$. (Draw Venn Diagram)

 - (d) A and B are independent.