Department of Electrical Engineering, University of Hawaii

EE 342: Probability and Statistics **Fall 2016**

Homerwork Set 1

Due date: Aug 31, 2016

(1) Chapter 1, problem 7, 8th edition

(2) Chapter 1, problem 13, 8th edition

(3) Chapter 2, problem 11, 8th edition

(4) Chapter 2, problem 12, 8th edition

(5) Chapter 2, problem 35, 8th edition

(6) Chapter 2, theoretical exercise 6, parts d, e, f only, 8th edition

(7) Chapter 2, theoretical exercise 11, 8th edition

(8) Let A and B be events with probabilities P(A)=3/4 and P(B)=1/3.
   a. Show that $1/12 \leq P(AB) \leq 1/3$ and give examples to show that both extremes are possible.
   b. Find corresponding bounds for P(AUB).

(9) A fair die is thrown twice. What is the probability that:
   a. A six turns up exactly once?
   b. Both numbers are odd?
   c. The sum of the scores is 4?
   d. The sum of the scores is divisible by 3?

(10) Show that the probability that exactly one of the events A and B occurs is
$$P(A) + P(B) - 2 \cdot P(AB)$$

7. **(a)** In how many ways can 3 boys and 3 girls sit in a row?

(b) In how many ways can 3 boys and 3 girls sit in a row if the boys and the girls are each to sit together?

(c) In how many ways if only the boys must sit together?

(d) In how many ways if no two people of the same sex are allowed to sit together?

13. Consider a group of 20 people. If everyone shakes hands with everyone else, how many handshakes take place?

11. A total of 28 percent of American males smoke cigarettes, 7 percent smoke cigars, and 5 percent smoke both cigars and cigarettes.

(a) What percentage of males smokes neither cigars nor cigarettes?

(b) What percentage smokes cigars but not cigarettes?

12. An elementary school is offering 3 language classes: one in Spanish, one in French, and one in German. The classes are open to any of the 100 students in the school. There are 28 students in the Spanish class, 26 in the French class, and 16 in the German class. There are 12 students that are in both Spanish and French, 4 that are in both Spanish and German, and 6 that are in both French and German. In addition, there are 2 students taking all 3 classes.

(a) If a student is chosen randomly, what is the probability that he or she is not in any of the language classes?

(b) If a student is chosen randomly, what is the probability that he or she is taking exactly one language class?

(c) If 2 students are chosen randomly, what is the probability that at least 1 is taking a language class?

35. Seven balls are randomly withdrawn from an urn that contains 12 red, 16 blue, and 18 green balls. Find the probability that

(a) 3 red, 2 blue, and 2 green balls are withdrawn;

(b) at least 2 red balls are withdrawn;

(c) all withdrawn balls are the same color;

(d) either exactly 3 red balls or exactly 3 blue balls are withdrawn.

6. Let E, F, and G be three events. Find expressions for the events so that, of E, F, and G,

(d) at least two of the events occur;

(e) all three events occur;

(f) none of the events occurs;

11. If $P(E) = .9$ and $P(F) = .8$, show that $P(EF) \geq .7$. In general, prove Bonferroni's inequality, namely,

$$P(EF) \geq P(E) + P(F) - 1$$