

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Department of Electrical and Computer Engineering

ECE 139

Probability and Statistics

Spring 2008

Homework Assignment #1

(Due on Monday 4/7/2008 by 6 pm *in the Homework Box*)

Problem # 1. Solve 1.2.1 in the text.

Problem # 2. Solve 1.2.2

Problem # 3. An experiment consists of a single roll of a die. Define sets (events): $A = \{\text{outcome is greater than 3}\}$ and $B = \{\text{outcome is odd}\}$. Specify:

- a) The sample space S .
- b) $A \cup B$
- c) $A \cap B$
- d) $A - B$
- e) $A^c \cap B^c$

Problem # 4. The difference set operation:

- a) Does $A - B = A - C$ imply that $B = C$? Justify.
- b) Consider the set $(A - B) - C$. Is it the same as any of the following sets: $A - (B - C)$, $(A - C) - B$, or $A - (B \cup C)$? Justify.

Problem # 5. Use the associative, distributive, De Morgan, or other laws to show that:

- a) $[A \cap (B \cup C)]^c = (A^c \cup B^c) \cap (A^c \cup C^c)$
- b) $(A \cap B \cap C)^c = A^c \cup B^c \cup C^c$

Also check the validity using Venn diagrams.

Problem # 6. Subsets:

- a) Given $A = \{a, b, c\}$, write out all its subsets.
- b) Let B be a set of N elements. Prove that it has 2^N subsets.