HW#2A

(1.) A certain town of population size 100,000 has 3 newspapers: I, II, and III. The proportion of townspeople that read these papers are follows:

I: 10 percent I and II: 8 percent
I and II and III: 1 percent
II: 30 percent I and III: 2 percent
III: 5 percent II and III: 4 percent

(The list tells us, for instance, that 8000 people read newspapers I and II.)

(a) Find the number of people reading only one newspaper.
(b) How many people read at least two newspapers?
(c) If I and III are morning papers and II is an evening paper, how many people read at least one morning paper plus an evening paper?
(d) How many people read only one morning paper and one evening paper?

(2.) Suppose that the universal set consists of the positive integers from 1 through 10. Let A = {2,3,4}, B = {3,4,5}, and C = {5,6,7}. List the members of the following sets.

(a) $\bar{A} \cap B$ (b) $\bar{A} \cup B$ (c) $\overline{\bar{A} \cap \bar{B}}$ (d) $A \cap (\overline{\bar{B} \cap C})$
(e) $\overline{A \cap (B \cup C)}$

(3.) Ten persons in a room are wearing badges marked 1 through 10. Three persons are chosen at random, and asked to leave the room simultaneously. Their badge number is noted.

(a) What is the probability that the smallest badge is 5?
(b) What is the probability that the largest badge number is 5?

(4.) A shipment of 1500 washers contains 400 defective and 1100 nondefective items. Two-hundred washers are chosen at random (without replacement) and classified.

(a) What is the probability that exactly 90 defective items are found? (do not compute out.)
(b) What is the probability that at least 2 defective items are found? (Do not compute out.)

(5.) A lot consists of 10 good articles, 4 with minor defects and 2 with major defects. One article is chosen at random. Find the probability that:

(a) it has no defects,
(b) it has no major defects,
(c) it is either good or has major defects.

(6.) If from the lot of articles described in Problem 5 two articles are chosen (without replacement), find the probability that:

(a) both are good, (b) both have major defects,
(c) at least one is good (d) at most one is good,
(e) exactly one is good (f) neither has major defects,
(g) neither is good.

(7.) From 6 positive and 8 negative numbers, 4 numbers are chosen at random (without replacement) and multiplied. What is the probability that the product is a positive number?