Stat 175 (Probability)

Problem Set No. 1

INSTRUCTIONS: Answer the following as indicated. Show detailed solutions.

1. Prove that $P(A_1 \cup A_2 \cup A_3) = P(A_1) + P(A_2) + P(A_3) - P(A_1 \cap A_2) - P(A_1 \cap A_3) - P(A_2 \cap A_3) + P(A_1 \cap A_2 \cap A_3)$. Justify every line of your proof.

2. An examination is designed where the students are required to answer any 20 questions from a group of 25 questions. How many ways can a student choose the 20 questions?

3. A box of 15 apples contains two defective apples. Four apples are selected at random.

    a. Find the probability that none of the selected apples is defective.

    b. Find the probability that at least one of the selected apples is defective.

4. A student prepares for an exam by studying a list of ten problems. She can solve six of them. For the exam, the instructor selects five problems at random from the ten on the list given to the students. What is the probability that the student can solve all five problems on the exam?