

MA 222 TEST ONE

Cindy Zhang, "I pledge my honor that I have abided by the Stevens Honor System."

Problem One. When does the equality $A \cap B = A$ hold?

A is a subset of B. For instance, let $A = \{1\}$; $B = \{1,2\}$; then $A \cap B = \{1\}$ which is A.

Problem Two. Express the event C in terms of A_k and B_j .

$$T1 = \{A1, A2\}$$

$$T2 = \{B1, B2, B3\}$$

$$\begin{aligned} \text{Event C} = \{ & (A1A2B1B2B3), (A1A2B1B2B3), (A1A2B1B2B3), \\ & (A1B1B2B3), \\ & (A2B1B2B3), \\ & (A1B1B2), (A1B2B3), (A1B1B3), \\ & (A2B1B2), (A2B2B3), (A2B1B3) \} \end{aligned}$$

Problem Three. Determine the probability that the next item will be good.

$$M \text{ Bad Ones. } \left(\frac{M}{M+N} \right)$$

$$N \text{ Good Ones. } \left(\frac{N}{M+N} \right)$$

$$K = P(N)$$

$$P(N | N) = \frac{P(N \text{ intersection } N)}{P(N)}, \text{ says: } N \text{ has occurred what's the probability } N \text{ will happen after.}$$

Problem Four. Given the probabilities of the events A and $A \cap B$, find the probability of the event $A \cap B'$.

Let us have A and $A' = \text{Sample Space}$.

This $A \cap B'$ says, we want the Sample Space $- B$.

$$\text{Given: } A \cap B = P(A) + P(B) - P(A \cup B)$$

$$\begin{aligned} P(A \cap B') &= P(A) + P(B') - P(B' \cup A) \\ &= P(A) + P(B') - (P(B') - P(A \cap B)) \\ &= P(A) - P(A \cap B) \end{aligned}$$