

**Mathematics 170A – HW3 – Due Tuesday, January 31, 2012.**

Problems 31,34,39,41,49,52 on pages 60-69.

$E_1$ . Suppose the events  $A, B, C$  are pairwise independent and satisfy

$$P(A) = \frac{1}{2}, \quad P(B) = \frac{1}{3}, \quad P(C) = \frac{1}{4}, \quad P(A \cup B \cup C) = \frac{35}{48}.$$

Are  $A, B, C$  independent? Explain.

$E_2$ . A man fires 12 shots independently at a target. In each shot, he has probability .9 of hitting the target.

(a) What is the probability that he hits the target at least once?

(b) What is the probability that he hits it at least twice, given that he hits it at least once?

$E_3$ . A population consists of 125 Democrats and 75 Republicans. A sample of size 10 is taken.

(a) What is the probability that the sample contains only Republicans, if the sampling is done without replacement?

(b) What is the probability that the sample contains only Republicans, if the sampling is done with replacement?

$E_4$ . A 5-card poker hand is dealt from a standard 52-card deck. Find the probability of each of the following occurring:

(a) Royal flush (10,J,Q,K,A) of the same suit).

(b) Flush (5 cards of the same suit).

(c) Straight (five cards in a sequence, regardless of suit).