

1. Everybody comes to Rick's cafe in Casablanca (Math 461 HW 6 Due 19/10/09).
 The three activities are gambling (G), drinking (D) and holding letters of transit to escape the Nazis (L). In one particular evening

(i) Everyone is doing one of these activities $P(G \cup D \cup L) = 1$

(ii) Everyone who has a letter is drinking $P(D|L) = 1$

(iii) $\frac{2}{3}$ of the people are drinkers $P(D) = .6$

(iv) $\frac{1}{2}$ the drinkers have a letter $P(L|D) = .5$

(v) $\frac{2}{3}$ of the people drinking and gambling have a letter
 $P(L|D \cap G) = \frac{2}{3}$ $P(D \cap G) = \frac{2}{3}$

(vi) 36% of the people are drinkers and gambling

Determine $P(L)$, $P(G)$ and $P(G|L \cap D)$.

(Of all the homework problems in all the world, you had to pick these.)

2. Bean counter Bill tells you that a certain data set has expectation 0, lies between -200 and 200 and 96% of the data (exactly) is between -20 and 20. Give both an upper and a lower bound for the standard deviation of the data. Here, $-200 \leq x \leq 200$ and $P(-20 < x < 20) = .96$ and give examples that show these are the best possible.

Note: This might involve ϵ 's and the bounds might actually be least upper bounds or greatest lower bounds

Big Hint: The extreme examples will have values only in the set $\{0, 20-\epsilon, -(20-\epsilon), 20, -20, 200, -200\}$