September 22, 1999 Math 244, Fall Name: _____
Must show all work for full credit!! Student #:_____

1. The median annual income for heads of households in a certain city is $ 17,900. Four such heads of household are randomly selected for inclusion in an opinion poll. Find the probability distribution of X, the number out of the four who have annual incomes below 17,900. (Hint: Median income means 50% have their income below the median and 50% have their income above it.)
(10 pts)

2. A Company buys tires from two suppliers- 1 and 2. Supplier 1 has a record of delivering tires that contain 5% defectives, whereas supplier 2 has a defective rate of 7%. Suppose that 40% of the current supplies came from supplier 1. If a tire is taken at random from this supply and is observed to be defective, what is the probability that it came from supplier 1?
(10 pts)

Formulas: $\binom{n}{r} = \frac{n!}{r!(n-r)!}$, $P_r^n = n(n-1)\cdots(n-r+1) = \frac{n!}{r!(n-r)!}$,

$P(A/B) = \frac{P(AB)}{P(B)}$, $P(\bar{A}) = 1 - P(A)$, $P(B_J/A) = \frac{P(B_J)P(A/B_J)}{\sum_{J=1}^{K} P(B_J)P(A/B_J)}$,

$P(X = x) = p(x), and \sum_x p(x) = 1.$