PHI 169 – CRITICAL REASONING – SAMPLE EXAM

Use the symbols for probability and set operations. Explain clearly your calculations.

(a) In Orange Beach, Alabama, there were 5,000 people living in 2015 and during that year there were 100 violent crimes. What is the probability that Aristeo, a random person living there, is the victim of a violent crime that year? (NB: Assume that, if at all, each person can be the victim of one crime, no more than one crime. Further, assume that each person is equally likely to be the victim of a crime absent any further information.)

(b) It turns out that that year 5 of the 100 violent crimes happened to people who were working in the "drug business" and there were 50 people in that business in Orange Beach that year. Aristeo was among them. Assuming Aristeo was involved in the drug business, what is the probability that Ariteo is the victim of a violet crime that year?

(c) Avital also lived in Orange Beach in 2015 but was *not* involved in the drug business. How probable is it that Avital is the victim of a violent crime that year? Who is more at the risk of being a crime victim? Avital or Aristeo?

(d) What is the probability of being in the drug business assuming one is a crime victim? Does your answer differ from (b)?

(e) Which one among people in race A, B, C or D is more likely to end up in prison? And which one among people in race A, B, C, or D, are you more likely to find in prison? Show your reasoning and calculations. [*Hint*: There is a difference between $Pr(A|B)$ and $Pr(B|A)$.]

race	# prisoners	#people
A	500,000	25,000,000
B	700,000	200,000,000
C	1,500,000	70,000,000
D	100,000	400,000

Based on your calculations, which race is worse off compared to the others?