

basic probability; due in 2 weeks

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1. Say your parents paid for your Rutgers education \$100k, was their investment a good one? University education is expected to increase lifetime earnings by .5m. Yet, it is not easy to graduate from Rutgers—sure 90% of students finish successfully, but first they need to pass a really hard statistics class, and only 20% of students pass statistics class—you cannot continue with your studies if you don't pass statistics. [hint: of course you need to calculate expected value]
2. Say you take 3 classes this semester. Again, it is hard to pass statistics—only 20% of students pass. But it is easy to pass other classes, say 90% pass both of the other classes—what is the probability you will continue to be a student (pass all three classes)?
3. Say you live in Delaware. The travel time is often 30 minutes from Camden to your house in Delaware (you live just across the river). But if the weather is bad, the travel time is 45 minutes, and weather is bad in New Jersey 60% of the time. One day per week, there is traffic accident, and then travel time is 2 hours. What is the expected travel time on any given day from Camden to your house in Delaware?
4. Say there are 7 Democrats and 3 females in this class of 10. There are no Independents (a person can be either Republican or Democrat). 2 females are Democrat. Put counts in a table, and calculate the probability that a male is a Republican. [That is, given that a person is a male, what is a probability, he is a Rep?]
5. Imagine you've landed your dream job as governor of the great state of NJ! As recent history indicates, it is important to plan for disasters! Say that there is a probability of .001 that severe storm like Sandy will hit the state in any given year. Sandy costed \$65 billion. But there is much higher probability that there will be damage due to more moderate weather. Say, on average, every month there is \$100,000 in damage due to weather in the state. What, (and by how much) is more costly to the taxpayer: typical weather damage or severe weather damage just like Sandy?
6. Say that probability that a male commits a crime during the five years of his adolescence (13-18 yo) is .01. The corresponding probability for a female is only .005. Probability increases sharply, five-fold, for both genders if a person's father was jailed during person's childhood. In which group there is more likely to happen a crime? That is, rank order the three groups in terms of probability that someone from the group commits a crime.
 - Group A: 100 adolescent males (no criminal history in family)
 - Group B: 200 adolescent females (no criminal history in family)
 - Group C: 50 adolescent females, whose father was jailed during their childhood

general directions (always the same):

- ps is due in Canvas by the beginning of the class
- keep it short; max: 5 single spaced pages; typically way less, say 1 or 2
- if you are stuck, email me early! also email if you want some feedback and make sure you are on the right track, etc
- show your work, a "naked" number won't do! unless indicated otherwise, always do calculations by hand
- likewise, numbers should be interpreted—we are not only interested in calculating values of interest, but we are interested in their meaning! whenever you calculate your final quantity of interest, interpret it! do interpret!! do make sure to make sense of the stats you've produced!!
- if your handwriting is bad, please type
- i may want to discuss your assignment in class, which should be beneficial to you and give you more feedback; if however, you'd like to keep it private, let me know!
- numbers in brackets are relative importance of each item for grading; adds up to 10
- always provide source of the original data, eg url, dataset name and brief description