ps6 basic probability

[version: Tuesday 3rd December, 2024 12:43]

1. .4*.9*.5m; or draw a tree: first stats: .4 and then other stuff: .9 so the probability of passing both, stats and other stuff is .4*.9, and the expected return is .4*.9*.5m and see if that's bigger than investment of .1m

2. 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.

	F	M	T
D	2	5	7
R	1	2	3
T	3	7	10

   based on the table: $P(R|male) = 2/7$
   or using formula $P(R|male) = \frac{P(R \cap male)}{P(male)} = \frac{2/10}{7/10} = 2/10 * 10/7 = 2/7$

   OR to calculate R and male:

   Note that the table is alike to an early example where we had 2 coin flips, and we counted outcomes, eg probability of 2 heads in 2 flips was 1/4 because there was just one such combined outcome of 1st and 2nd flip out of four possible such combined outcomes. Likewise here, we look at the table and we see that only 2 out of 10 are like that.

   based on the table: $P(R \cap male) = 2/10$

   or using formula:

   can't just do 7/10*3/10–they're not independent–we got a male (7/10) and now getting Republican who is a male so not out of everyone (3/10), but out of males: (2/7); it's like with a tree–we got first to males and now getting to Republicans out of those males, not out of everyone; mathematically:

   given that: $P(R|male) = \frac{P(R \cap male)}{P(male)}$:
   $P(R \cap male) = P(R|male) * P(male) = 2/7 * 7/10 = 14/70 = 2/10$

   or could do it the other way, starting with probability of a Republican: 3/10*2/3=2/10

   If events were independent, we would just multiply probabilities. If they are not independent or we are unsure–use this formula.

   More elaboration: `http://davidmlane.com/hyperstat/A127969.html`
   `http://davidmlane.com/hyperstat/A129515.html`
   `https://www.mathsisfun.com/data/probability-events-independent.html`

3. Is .001* 65,000,000,000 $>$ 100,000 *12

---

general directions (always the same):

- ps is due in Canvass 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 if 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