

Special Methods of Data Analysis
Bonus Examples

1. Suppose a voter poll is taken in three states. In state A, 50% of voters support the liberal candidate, in state B, 60% of the voters support the liberal candidate, and in state C, 35% of the voters support the liberal candidate. Of the total population of the three states, 40% live in state A, 25% live in state B, and 35% live in state C. Given that a voter supports the liberal candidate, what is the probability that she lives in state B?

1p

2. The amount of time, in hours, that have a computer functions before breaking down is a continuous random variable with probability density function given by

$$f(x) = \begin{cases} 5 \cdot 10^{-5} e^{-5 \cdot 10^{-5} x}, & x > 0 \\ 0, & x \leq 0. \end{cases}$$

Find the probability that the computer will break down within the first 100 hours and expected value of the amount of time, that have a computer functions before breaking down.

1p

3. On the average, a certain computer part lasts 10 years. The length of time the computer part lasts is exponentially distributed.
- What is the probability that a computer part lasts more than 7 years?
 - On the average, how long would 5 computer parts last if they are used one after another?
 - Eighty percent of computer parts last at most how long?
 - What is the probability that a computer part lasts between 9 and 11 years?

1p

4. A sample of 400 memory chips from a production line are tested, and 32 are defective. At the 0.05 level, test to see if the proportion of defective chips is less than 0.1. + Calculate 95% confidence interval for proportion of defective chips.

1p

5. A university classifies faculty by rank as *instructors*, *assistant professors*, *associate professors*, and *full professors*. The data, by faculty rank and gender, are given in the following contingency table. Test to see if faculty rank and gender are independent.

Faculty	Instructor	Assistant Professor	Associate Professor	Full Professor
Male	62	238	185	115
Female	118	122	123	37

1p