

Practice Exam 2

- In a health science study, n healthy men will be randomly selected and their systolic blood pressure level will be measured. The measurements will be used to estimate the true average blood pressure level μ . Suppose the blood pressure level follows a normal distribution with unknown mean μ and variance 9.
 - Find n necessary to estimate μ within 1 with probability 0.95.
 - Consider hypothesis $H_0 : \mu = 120$ versus $H_a : \mu > 120$. How many n need to be measured so that the 0.01 level test has $\beta(125) = 0.01$ (which is type II error when $\mu' = 125$)?
- Suppose the number of daily phone calls made to a technical troubleshooting call center follows a Poisson distribution with mean μ . Suppose during a period of 121 days, we observed X_1, \dots, X_{121} , where X_i is the number of phone calls of the i th day. 121 samples yield $\bar{x} = 25$ and $s = 7$. There is a belief that $\mu = 20$. Do the data provide evidence that indicate $\mu < 20$? Use significance level $\alpha = 0.05$.
- The weight (in pound) of healthy Wisconsin male in their 20's is considered to follow a normal distribution with unknown mean μ and unknown variance σ^2 . 15 randomly selected men were weighed and resulted in sample mean 190 and sample standard deviation 10. Construct a 90 % confidence interval for μ .
- It is known that 40 % of Wisconsin people like *South Park*. A survey is to be done to see if Colorado residents like *South Park* more than Wisconsin residents. A random sample of 10 Colorado residents were surveyed if they like this TV show or not, and let X denote the number of people who answered they like the show. The study is test hypothesis $H_0 : p = 0.4$ versus $H_1 : p > 0.4$. *You may just provide numerical expressions for the answers of the questions below but do not have to evaluate final numerical values.*
 - For a test procedure with rejection region $X \geq 6$, find type I error.
 - For another test procedure with rejection region $X \geq 4$, find type II error at $p' = 0.5$.
 - The study will reject H_0 if X is considerably large. Suppose that of 10 Colorado peoples, 7 people were found to like *South Park*. Find the p-value.