

Power & Sample Size

1. In a 2-sample t-test, average time is 15 days with a standard deviation, $s = 2$ days.
The sample size must be large enough to provide a 95% chance of detecting a difference (if it exists) in the average times, as small as 3 days. Using an alpha risk of 0.05, what sample size would you recommend?
2. In a destructive testing process, management has decided that only 6 samples can be used. If $\alpha = 0.05$, and $\beta = 0.1$. What is the smallest difference we can reliably detect in a one-sided test?
3. In testing stage has 6% defective. The process was improved and now the improvement team claims that there is only 1% defective. How many samples must the team examine to reliably detect this improvement?
4. In a 1-sample t-test which consists of a very expensive destructive testing, only 3 samples were collected. Sigma was found to be 0.4. So the team decided that their tested should be able to detect a true difference of at least 1 sigma.
5. Considering that it is an important safety test, decide suitable alpha. What is the power of this test? Is it sufficient? How many more samples are needed if the power should be kept at 0.8? If more samples cannot be collected, then as a BB, how will you conclude the results of the test