POWER

Suppose $X_1, \ldots, X_2 5$ represent the IQs of n students sampled from the Cal student body. IQs are standardized to be normal with mean 100 and SD 15. The Cal sample has a mean of 104 and an SD of 14.6.

Are Cal students on average smarter than the norm?
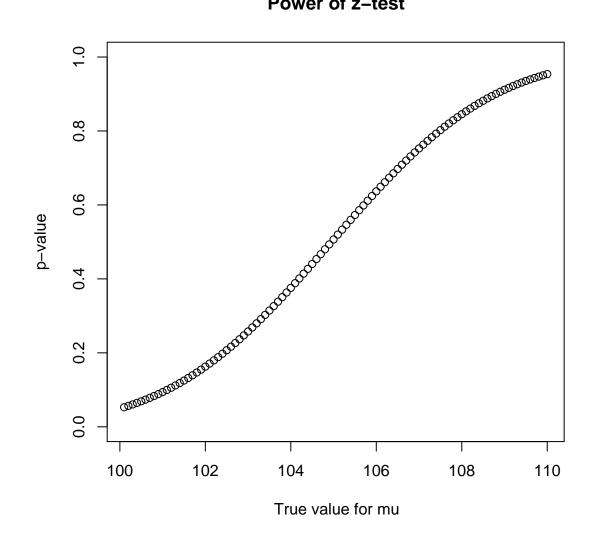
Null hypothesis

Alternative hypothesis

Test statistic

p-value

Note that we do not reject the null hypothesis. We may ask ourselves, how likely is it that the test would detect a difference (i.e. reject the null at the $\alpha = 0.05$ level) when the true mean is 104?

$$P(\text{test statistic} \geq 1.65 | \mu = 104)$$

In general, we might want to compute this chance for various values of μ to see how sensitive this test is to departures from the hypothesized mean. A power curve gives us these values. That is, it computes $P(\text{test statistic} \geq 1.65 | \mu)$ for various values of μ.

Power of z−test

True value for mu

p−value