

5. To evaluate the success of a one-year remedial math course, the mathematics scores of the students who complete this course will be compared with the statewide average of 525 points. Researchers know from the previous study that the standard deviation is approximately 80, and they have a reason to believe that the actual mean is 550. If the significance level is chosen to be 0.05, what sample size is needed to have a probability of Type II error at most 0.025?

Claim: $\mu = \text{average score} > 525$

$$H_0: \mu \leq 525 \quad \longrightarrow \quad H_A: \mu > 525$$

Researchers believe:

$$\mu = 550, \quad \sigma = 80$$

$$n = ?$$

significance level $\alpha = 0.05$

Researchers desire:

$$\text{type II error } \beta \leq 0.025$$

The power is 0.975, and the corresponding sample size is 135

6. To study the effectiveness of a weight-reducing agent, a clinical trial was conducted. 35 overweight males were placed on a fixed diet for two weeks, and each was weighed at the end of this period. Then for the next two weeks, each is given a supply of the weight-reducing agent in addition to the fixed diet. At the end of the second period weights were obtained again. Researchers want to test at the significance level 0.05 that the mean weight reduction using this agent is greater 5 pounds. Provided that the mean weight reduction is 8 pounds, the test is required to have the power at least 90%. From the previous study the researchers know that the standard deviation is approximately 6.8 pounds. Is a sample size of 35 large enough to meet the researchers' requirements for the test? If not, what sample size is needed?

Claim: $\mu = \text{the weight reduction} > 5$

$H_0: \mu \leq 5 \longrightarrow H_A: \mu > 5$

Researchers believe:

$$\mu = 8, \quad \sigma = 6.8$$

what they have:

$$n = 35$$

It has the power of 81%

In order to achieve the power more than

90% we need $n = 46$