統計分析手法
2014
小テスト 3

- **1**: Assuming as usual that samples are random, answer True or False; if False, correct it.
  a. Samples are used for making inferences about the population from which they are drawn.
  b. μ is a random variable (varying from sample to sample), and is an unbiased estimator of the parameter $\bar{X}$.
  c. If we double the sample size, we halve the standard error of $\bar{X}$, and consequently double its accuracy in estimating the population mean.
  d. The sample proportion P is an unbiased estimator of the population proportion π.

- **2**: A random sample of 5 states gave the following areas (in 1000 square miles):

  $$147, 84, 24, 85, 159$$

  a. Find the 95% confidence interval for the mean area for all 50 states in the United States.
  b. Find the 95% confidence interval for the total area of the United States.
  c. The total area in fact is 3620 thousand square miles. Does the confidence interval bracket it?

- **3**: In a large American university in 1969, the men and women professors were sampled independently, yielding the annual salaries given below (in thousand dollars):

Women	Men
9	16
2	19
8	12
10	11
16	22

  a. Calculate a 95% confidence interval for the mean salary difference between men and women.
  b. How well does this show the university's discrimination against women?

- **4**: A firm producing plate glass has developed a less expensive tempering process to allow glass for fireplaces to rise to a higher temperature without breaking. To test it, five different plates of grass were drawn

randomly form a production run, then cut in half, with one-half tempered by the new process, and the other half by the old. The two halves then were heated until they broke, yielding the following data:

breaking temperature	
new	old
475	485
436	438
495	493
483	486
426	433

Calculate a 95% confidence interval for the mean improvement in breaking temperature.

- **5**: Soon after he took office in 1963, President Johnson was approved by 160 by out of a sample of 200 Americans. With growing disillusionment over his Vietnam policy, by 1968 he was approved by only 70 out of a sample of 200 Americans.
  a. What is the 95% confidence interval for the percentage of all Americans who approved of Johnson in 1963? In 1968?
  b. Find a 95% confidence interval for the change in this percentage from 1963 to 1968.