

Practice Midterm Exam 2

Answer all questions in your bluebook. Make certain you write your name, your student ID number, and your TA's name on your bluebook.

Point allocations are proportional to time allocations. Partial credit will be awarded if the written material indicates understanding of how to answer the question (i.e., gibberish will not be given credit).

1. (10 minutes) A firm believes the internal rate of return for its proposed investment can be best described by a normal distribution with mean 20% and standard deviation 3%. What is the probability that the internal rate of return for the investment will be at least 15.5%?
2. (10 minutes) A random sample of size $n = 30$ is to be drawn from a population with $\mu = 500$ and $\sigma = 200$. What size sample would be necessary in order to reduce the standard error to 25?
3. (10 minutes) Many people think that a national lobby's successful fight against gun control legislation is reflecting the will of a minority of Americans. A random sample of 4,000 citizens yielded 2,250 who are in favor of gun control legislation. Based on the information above, estimate the true proportion of all Americans who are in favor of gun control legislation using a 99% confidence interval.
4. (10 minutes) Sales of a new line of athletic footwear are crucial to the success of a newly formed company, Fleet Shoes. Fleet wishes to estimate the average weekly sales of the new footwear to within \$200 with 95% reliability. The initial sales indicate the standard deviation of the weekly sales figures to be approximately \$1,500. How many weeks of data must be sampled for Fleet to get the information it desires?
5. (9 minutes) The Chronicle of Higher Education Almanac (Aug. 1992) reported that for the 1990-1991 academic year 4-year private colleges charged students an average of \$9,083 for tuition and fees. Suppose a random sample of 40 4-year private colleges yielded the following data on tuition and fees for the 1992-1993 academic year: $\bar{x} = \$9,750$ and $s = \$1,750$. Calculate the test statistic for the test of hypothesis desired.

[OVER]

The following are True/False/Explain questions. To gain full credit, a correct explanation must be provided. The explanation should be no longer than one or two sentences and/or equations.

6. (True/False/Explain) (7 minutes) Bernoulli wants to estimate the mean height of Americans. He has a random sample of 10,000 Americans. However, because of limitations on computing time, he only takes his sample average over 300 of these peoples' heights. This means that Bernoulli's estimate of the population mean will be biased.

7. (True/False/Explain) (7 minutes) A confidence interval with a 100% confidence level is ideal and is the most useful in practice.

8. (True/False/Explain) (7 minutes) Using a random sample of 150 children, Pascal constructs a 95% large-sample confidence interval for the mean number of siblings children have. This distribution displays extreme rightward skew (since a few families have many children) and is not symmetric. Pascal's confidence interval is still valid.

4.11.2003