



American University of Beirut

STAT 201

Elementary Statistics

Fall 2003-2004

Final Exam

Date: Friday, January 23, 2004 - 1:30 pm to 3:00 pm

Instructor: Dr. Mohamed Kobeissi

Name: .....

ID #: .....

Section: 2

This is NOT an open-book exam. You are allowed to have a formula sheet and a calculator. There are 12 questions totaling 60 points. A question with more than one answer will be counted as wrong. A correct answer is 5 points, a wrong and/or an unanswered question is 0 points.

*Good Luck*

I. Use the following information to answer questions 1 to 3. Scores on an aptitude test are normally distributed with a mean of 220 and a standard deviation of 30.

1. For a random sample of size 50, what is the mean of the variable  $\bar{x}$ ?

- A. 220      B. 50      C. 170      D. 30      E. none of the above

2. For a random sample of size 50, what is the standard deviation of the variable  $\bar{x}$ ?

- A. 212.13      B. 50      C. 30      D. 4.24      E. none of the above

3. What is the probability that the sampling error made in estimating the population mean by the mean of a random sample of 50 test scores will be at most 5 points?

- A. 0.881      B. 0.135      C. 0.762      D. 0.999      E. none of the above

4. For the population of one town, the number of siblings is a random variable whose relative frequency histogram is left-skewed. Let  $\bar{x}$  denote the mean number of siblings for a random sample of size 45. For samples of size 45, which of the following statements concerning the sampling distribution of the mean is true?

- i)  $\bar{x}$  is approximately normally distributed.
- ii) The distribution of  $\bar{x}$  is left-skewed.
- iii) The distribution of  $\bar{x}$  is approximately left-skewed.
- iv)  $\bar{x}$  is normally distributed.

- A. (i)      B. (ii)      C. (iii)      D. (iv)      E. none of the above

II. Use the following information to answer question 5 to 7. A sample of 45 eggs yields a mean weight of 1.37 ounces. Assuming that  $\sigma = 0.53$  ounces.

5. Find the margin of error in estimating  $\mu$  at the 95% confidence level.

- A. 0.15      B. 0.13      C. 6.71      D. 0.02      E. none of the above

6. Find a confidence interval for  $\mu$  at the 95% confidence level.

- A. [0.37;2.37]      B. [1.22;1.52]      C. [1.35;1.39]      D. [1.27;1.47]      E. none of the above

7. At 95% confidence level, what sample size is needed to ensure a margin of error of 0.1?

- A. 108      B. 86      C. 95      D. 241      E. none of the above

8. Suppose you have obtained a 95% confidence interval for  $\mu$ . Which of the following statements is/are true regarding the relationship between precision and confidence level? Assume the sample size is fixed.

- i) Decreasing the confidence level to 90% will result in a greater precision.  
ii) Increasing the confidence level to 99% will result in a narrower interval.  
iii) Increasing the precision will result in a higher confidence level.  
iv) Decreasing the precision will result in a higher confidence level.

- A. (ii) and (iii)      B. (i) and (iv)      C. (ii) and (iv)      D. (i) and (iii)      E. none

9. Suppose that [34.2; 38.4] is a 99% z-distribution confidence interval for a population mean based on sample of size 50. What is the sample mean?

- A. 38.4      B. 72.6      C. 34.2      D. 36.3      E. none of the above

10. Refer to previous question, what is the population standard deviation?

- A. 5.76      B. 7.57      C. 9.05      D. 8.9      E. none of the above

11. Suppose that scores for men on an aptitude test has greater standard deviation than scores for women on the same test. Based on a sample of size 50, a 95% confidence interval for the mean score,  $\mu$ , of all women has a margin of error of 2.2. Which of the following confidence intervals will have a smaller margin of error?

- i) A 95% confidence interval for the mean score of men. Sample size 50.  
ii) A 99% confidence interval for the mean score of women. Sample size 50.  
iii) A 95% confidence interval for the mean score of women. Sample size 100.

- A. (iii)      B. (ii)      C. (i)      D. (i) and (ii) and (iii)      E. none of the above

12. Let  $X$  have a normal distribution with  $\sigma = 1.1$ . What is the mean of  $X$  if  $P(X < 7) = 0.5$ .

- A. 7      B. 0.5      C. 1.1      D. 7.8      E. none of the above

13. (bonus 2 points) STAT 201 was FUN?

- A. true      B. false      C. none of the above