# American University of Beirut

## STAT 201

*Elementary Statistics*

*Fall 2004*



## Final Exam

Name: ..... ID #: .....

Your are allowed to have a formula table, statistics tables and a calculator. If you want to change your choice, just cross out your first choice and circle your new choice. If you think an answer is not given, circle the letter E, and write your one answer next to it. Don't write anything else on the exam sheet. *Good luck*

**1.** Three balanced dice are rolled, what is the probability that all the dice come up the same number?

A. 1/216 B. 1/36 C. 1/729 D. 1/64 E. none of the above

**2.** For a normal population, a sample of size 15 is drawn with sample mean 11.45 and sample standard deviation 3.12. What is a 99% confidence interval for the population mean?

A. [9.38;13.52] B. [9.34;13.56] C. [9.73;13.17] D. [9.05;13.85] E. none of the above

**3.** If the testing of $H_0 : \mu_1 = \mu_2$ vs $H_a : \mu_1 \neq \mu_2$ at significance level $\alpha$ results in not rejecting $H_0$, then which of the following is true?

i) A one tailed test will reject $H_0$ at significance level $\alpha$.

ii) The hypothesized value will not lie in a $(1-\alpha)100\%$ confidence interval for $\mu$.

iii) The hypothesized value will lie in a $(1-\alpha)100\%$ confidence interval for $\mu$.

iii) The observed value will not lie in a $(1-\alpha)100\%$ confidence interval for $\mu$.

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

**4.** Eight people are in a room. Their mean age is 32, and their median age is 27. A 40 year-old man leaves the room, and a 60 year-old woman enters. What is the median age of the people in the room now?

A. 27 B. 32 C. 40 D. 60 none of the above

**5.** Which of the following statements is(are) true concerning the following three sets of data?

| Set I | | | | |
|---|---|---|---|---|
| -1 | -1 | 0 | 1 | 1 |

| Set II | | | | |
|---|---|---|---|---|
| -2 | -2 | 0 | 2 | 2 |

| Set III | | | | |
|---|---|---|---|---|
| -2 | -1 | 0 | 1 | 2 |

i) Data in set I has greater variability than both data in set II and set III.

ii) Data in set II has greater variability than both data in set I and set III.

iii) Data in set III has greater variability than both data in set I and set II.

iv) All the three sets have the same mean and the same standard deviation.

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

6. 73% of the population have cats, and 54% have dogs. What is the minimum percentage of people that have both animals?

A. 19% B. 39% C. 27% D. 21% E. none of the above

7. The weight of newborn babies in Lebanon is a normally distributed variable with mean 3 kg and standard deviation 0.4 kg. If a newborn baby is selected at random, hat is the probability that he weighs between 2.7 and 3.5 kg?

A. 0.42 B. 0.83 C. 0.67 D. 0.55 E. none of the above

**Use the following information to answer questions 8 to 11. In the past, the mean running time for a certain type of flashlight battery has been 9.8 hours. the manufacturer has introduced a change in production method and want to perform a test to determine if the mean running time has increased as a result. A randomly selected sample of 30 batteries yields a mean running time of 10.2 hours. Assume the population standard deviation is 1.3 hours.**

8. What are the null and the alternative hypothesis to test the manufacturer's claim?

i) $H_0 : \mu = 9.8$ vs. $H_a : \mu < 9.8$

ii) $H_0 : \mu = 10.2$ vs. $H_a : \mu \neq 9.8$

iii) $H_0 : \mu = 9.8$ vs. $H_a : \mu > 9.8$

iv) $H_0 : \mu = 10.2$ vs. $H_a : \mu < 9.8$

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

9. At 5% significance level, which of the following statement is(are) true?

i) $H_0$ is accepted.

ii) we don't have enough evidence against $H_0$.

iii) we are undecided.

iv) there is enough evidence to support the claim that the mean running time of all light bulbs has increased from the previous mean of 9.8 hours.

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

10. Construct a 95% confidence interval for $\mu$.

A. [9.73; 10.66] B. [9.71; 10.68] C. [9.71; 10.66] D. [9.73; 10.68] E. none of the above

11. If in fact the mean running time of the batteries is greater than 9.8 hours, then based on the above study, your decision is:

i) type I error

ii) correct decision

iii) type II error

iv) no decision can be made

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

**12.** A prospective purchaser of a fast food franchise is told that the daily earnings for the franchise have a standard deviation of \$90 a day. The purchaser wishes to estimate the actual average daily earnings to within \$20 with a probability of at least 0.95. How large a sample should he choose, if such earnings are normally distributed?

A. 54 B. 77 C. 55 D. 78 E. none of the above

**13.** The average weight of sardines caught at cheat lake is 35 grams with a standard deviation of 4 grams. What is the probability that the mean of a sample of 64 sardines will exceed 36 grams?

A. 0.0228 B. 0.9544 C. 0.456 D. 0.0026 E. none of the above

**14.** A set of 50 scores has mean 80 and standard deviation 20. If 4 were added to each of the scores, what would be the new standard deviation?

A. 80 B. 24 C. 20 D. 84 E. none of the above

**15.** 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 form 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 99% confidence interval for the mean score of women. Sample size 50.

ii) A 95% confidence interval for the mean score of women. Sample size 100.

iii) A 95% confidence interval for the mean score of men. Sample size 50.

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

**16.** *(bonus 2 points)* STAT 201 was fun?

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