AMERICAN UNIVERSITY OF BEIRUT

Statistics 201, Final Examination
Time = 1 hour and 30 minutes
January 25, 2005

Aids allowed: One standard formula sheet, a calculator, the standard normal table, and the student-t table.
Instructions: Please, use the question sheet to mark your answers. One and only one answer is permissible for the multiple choice questions; otherwise you may lose credits for multiple answers. Please, use the booklet to explain your answers and hence you might earn partial credits if answer were incorrect.
Finally, PRINT your name and ID number on both question sheet and booklet! Good Luck!

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(1) 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 new median age of the people in the room now?

(a) 32 (b) 27 (c) 40 (d) 60 (e) none of the above

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(2) A set of 50 scores has mean 80 and standard deviation 20. If 4 were added to each of the scores, which of the following measures remain unchanged?

(a) mean (b) median (c) mode (d) standard deviation (e) none of the above

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(3) 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) 0.4560 (b) 0.9544 (c) 0.0228 (d) 0.0026 (e) none of the above

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(4) 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?

(a) 78 (b) 88 (c) 98 (d) 105 (e) none of the above

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(5) Death certificates provide data on the causes of death. Then the most appropriate measure of the centre is

(a) The mean (b) the median (c) the mode (d) the interquartile range (e) we can not tell because the sample is not large enough.

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(6) 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 36 batteries yields a mean running time of 10.2 hours. Assume the population standard deviation is 1.3 hours. Which of the following hypotheses test the manufacturer's intention:

(a) H_0: $\mu = 9.8$ vs $H_a: \mu > 9.8$
(b) H_0: $\mu = 9.8$ vs $H_a: \mu < 9.8$
(c) H_0: $\mu = 10.2$ vs $H_a: \mu > 10.2$
(d) H_0: $\mu = 9.8$ vs $H_a: \mu \neq 10.2$
(e) (e) none of the above

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(7) 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) (9.05, 13.85) (b) (9.34, 13.56) (c) (9.73, 13.17) (d) (13.52, 9.38) (e) none of the above

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(8) Suppose that 40% of students suffer from math anxiety. Assume further that two such students are randomly selected. What is the probability that neither one of them will suffer from math anxiety?

(a) 0.25 (b) 0.36 (c) 0.40 (d) 0.80 (e) none of the above

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(9) We would like to design a survey to estimate the mean age μ of the Lebanese labor force. What is the required sample size if we would like to be within 0.5 of μ with confidence of 90%? Assume that $\sigma = 12.15$ years

(a) 1598 (b)1700 (c) 1789 (d) 2323 (e) none of the above

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(10) Phosphate levels for a single person tend to vary normally over time. The data on one patient are given below:

5.6, 5.1, 4.6, 4.8, 5.7, 6.4

What is the margin of error for the mean μ if the confidence level is 90% and $\sum x = 32.2$ and $\sum x^2 = 175.02$.

(a) 0.55 (b) 0.87 (c) 2.015 (d) 2.322 (e) none of the above

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(11) If the 99% confidence interval for μ is (10.75, 16.75) and the sample size is 40, what is the sample mean?

(a) 2.58 (b) 6.75 (c) 13.75 (d) 16.75 (e) none of the above

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(12) X has a normal distribution with mean 0 and unknown standard deviation σ. What is the value of σ if $P(X \leq 3.92) = 0.975$?

(a) 2.00 (b) 1.06 (c) 1.33 (d) 1.07 (e) none of the above

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(13) For the hypothesis H_0: $\mu = \mu_0$ vs $H_a: \mu \neq \mu_0$, the Z_{obs} was calculated and is found to have the value 1.34. Then the p-value is
(a) 0.0109 (b) 0.0901 (c) 0.1802 (d) 0.9010 (e) none of the above

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(14) Refer to previous question (13). If the significance level is set at 10%, then which one of the following statements is true:
(a) Reject the null hypothesis (b) We can not reject the null hypothesis (c) We can not decide according to the above information.
(d) We don't have the probability of type II error to make a decision.
(e) none of the above

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(15) The Central Limit Theorem states that:
(a) The normal distribution is symmetric about 0
(b) For data sets with large sample size, he sample mean has approximately a normal distribution.
(c) The sample standard deviation is always 1
(d) The median is always less than the mean
(e) none of the above
