KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
MATHEMATICS DEPARTMENT

STAT 211 BUSINESS STATISTICS II
Semester 211, Final Exam
Sunday December 26, 2021

Name: _____ ID #: _____

Section #: _____ Serial #: _____

😊Important Note:

- Formula sheet will be provided to you in exam. You are not allowed to bring, with you, formula sheet or any other printed/written paper.
- Mobiles are not allowed in exam. If you have your mobile with you, turn it off and put it under your seat so that it is visible to proctor.
- Make sure you have 9 unique pages of exam paper (including this title page).

1. 1A mail-order computer business has six telephone lines. Let X denote the number of lines in use at a specified time. Suppose the probability mass function of X is as given in the accompanying table.

X	0	1	2	3	4	5	6
P(X=x)	0.1	0.15	0.2	0.25	K	0.06	0.04

Where K is a positive real number, then the expected value of the random variable X is

a. 2.64
b. 1.85
c. 0.80
d. 1
e. 3

2. 2Suppose that we are interested in students' grades in STAT-211 (A+, A, B+, B,..., D+, D), then the variable grades is

a. Qualitative ordinal
b. Qualitative nominal
c. Quantitative discrete
d. Quantitative continuous interval-scale
e. Quantitative continuous real

3. 3A civil engineer monitors eater quality by measuring the amount of suspended solids in a sample of river water. Over 11 weekdays, he observed 12, 14, 19, 20, 21, 28, 29, 30, 55, 63, and 63. Then the inter quartile range (IQR) and the data shape are:

a. IQR=36 and the data shape is right skewed.
b. IQR=6 and the data shape is symmetric.
c. IQR=9 and the data shape is symmetric.
d. IQR=27 and the data is left skewed.
e. QR=8 and the data is symmetric.

4. 4The following are the number of minutes that a person had to wait for a bus to work in 15 working days: 7, 3, 5, 14, 5, 5, 11, 10, 7, 9, 5, 14, 6, 11 and 8. If A = mean and B = median, then 4A+4B is equals to:

a. 60
b. 46
c. 84
d. 32
e. 7

5. 5A company that produces fine crystal knows from experience that 5% of its goblets have cosmetic flaws and must be classified as 'seconds'. Among 5 randomly selected goblets, the probability that at most one is a second equals to:

    a. 0.9774
    b. 0.2036
    c. 0
    d. 0.7738
    e. 0.0226

6. 6Suppose that the number of claims handled daily by an insurance company is modeled by Poisson distribution with an average of 6 claims per day. What proportion of days have more than 2 claims?

    a. 0.9380
    b. 0.0620
    c. 0.0446
    d. 1
    e. 0.9554

7. 7If 11% of the memory chips in a certain plant are defective, what is the probability that in a lot of 201 randomly chosen chips for inspection we get at most 20 defective chips using Normal Approximation with continuity correction.

    a. 0.3594
    b. 0.7224
    c. 0.3156
    d. 0.6406
    e. 0.2776

8. 8It is known that Michelin tyres last on average for 34 thousand km with a standard deviation of 6 thousand km. If the chances are 90.5% that the lifetime of a tyre will be within symmetrical limits, say K_1 and K_2, then K_1 and K_2 are respectively equal to:

    a. K1 = 23.98 thousand km, K2 = 44.02 thousand km
    b. K1 = 25.5 thousand km, K2 = 42.52 thousand km
    c. K1 = 21 thousand km, K2 = 47.02 thousand km
    d. K1 = 26.98 thousand km, K2 = 41.02 thousand km
    e. K1 = 19.5 thousand km, K2 = 48.52 thousand km

9. 9Given a standard normal distribution, find the value of constant 'c' such that P(-c < Z < c) will be 68.26% of the total area, then the value of constant c is equals to:

    a. 1
    b. 0
    c. 0.5
    d. 2
    e. 3

10. 10A sugar refinery processing plant is receiving raw sugar in bulk. The amount of sugar that the plant can process in one day is modeled by an exponential distribution with a mean of 3 (in tons). How much raw sugar should be stocked for the plant each day so that the chance of running out of product is only 0.18?

    a. 5.144 tons
    b. 0.0662 tons
    c. 0.5716 tons
    d. 0.4173 tons
    e. 0.5954 tons

11. 11The fracture strengths of a certain type of glass average 21.75 (in thousands per square inch) and have a standard deviation of 1.5, what is the probability that the average fracture strength of 64 pieces of these glasses exceeds 22.1?

    a. 0.0307
    b. 0.4090
    c. 0.9693
    d. 0.1075
    e. 0.5910

12. 12Suppose that an internal report submitted to the managers at a bank in Boston showed that with 95 percent confidence, the proportion of the banks customers who also have accounts at one or more other banks is between 0.13 and 0.67. Given this information, what is the point estimate of the proportion of the banks customers who also have accounts at one or more other banks?

    a. 0.4
    b. 0.05
    c. 0.13
    d. 0.67
    e. 0.8

13. 13In an application to estimate the mean number of miles that downtown employees commute to work round trip each day, the following information is given for a sample of size 12 with mean 4.12 and standard deviation 2.3. If the desired confidence level is 99 percent, the appropriate critical value is:

    a. 3.1058
    b. 3.0545
    c. 2.58
    d. 2.33
    e. 2.7181

14. 14Suppose that an internal report submitted to the managers at a bank in Boston showed that with 95 percent confidence, the proportion of the bank's customers who also have accounts at one or more other banks is between 0.45 and 0.51. Given this information, what sample size was used to arrive at this estimate?

    a. 1066
    b. 17
    c. 9604
    d. 751
    e. 6766

15. 15A 95% confidence interval estimate for a population mean is determined to be 65.48 to 76.52. Which of the following is true if a 90% confidence interval for μ is constructed?

    a. It is narrower than the 95% confidence interval
    b. It is wider than the 95% confidence interval
    c. It is the same as the 95% confidence interval
    d. It is the same as the 99% confidence interval
    e. There is not enough information to determine the answer

16. 16An economist is interested in studying the incomes of consumers in a particular country. The population standard deviation is known to be $1,000. A random sample of 50 individuals resulted in a mean income of $15,000. What is the width of the 90% confidence interval?

    a. $465.28
    b. $232.60
    c. $364.30
    d. $659.02
    e. $728.60

17. 17A major department store chain is interested in estimating the mean amount its credit card customers spent on their first visit to the chain's new store in the mall. Fifteen credit card accounts were randomly sampled and analyzed with the following results: the sample mean $50.5 and sample standard deviation $20. Construct a 95% confidence interval for the mean amount its credit card customers spent on their first visit to the chain's new store in the mall assuming that the amount spent follows a normal distribution.

    a. $50.5 $\pm$ $11.08
    b. $50.5 $\pm$ $9.09
    c. $50.5 $\pm$ $10.12
    d. $50.5 $\pm$ $11
    e. $50.5

18. 18The life in hours of a 75-watt light bulb is known to be normally distributed with standard deviation 25. If you want the total width of a 95% confidence interval on mean life to be 6 hours. What sample size should be used?

    a. 267
    b. 266
    c. 17
    d. 188
    e. 16

19. 19In an effort to estimate the mean dollars spent per visit by customers of a food store, the manager has selected a random sample of 100 cash register receipts. The mean of these was $45.67 with a sample standard deviation equal to $12.30. Assuming that he wants to develop a 90 percent confidence interval estimate, which of the following is the margin of error that will be reported?

    a. about $\pm$ $2.023
    b. about $\pm$ $50.2
    c. about $\pm$ $1.645
    d. about $\pm$ $1.43
    e. $\pm$ $0.05

20. 20Two samples each of size 25 are taken from independent populations assumed to be normally distributed with equal variances. The first sample has a mean of 35.5 and standard deviation of 3 while the second sample has a mean of 33 and standard deviation of 4. the pooled variance is

    a. 12.5
    b. 3.535
    c. 225
    d. 7
    e. 25

21. 21Suppose a 95% confidence interval for μ turns out to be (1000, 2100). To make more useful inferences from the data, it is desired to reduce the width of the confidence interval. Which of the following will result in a reduced interval width?

    a. Increase the sample size.
    b. Increase the confidence level.
    c. Increase the population mean.
    d. Increase the sample mean.
    e. The sample size will be the same

22. 22Most major airlines allow passengers to carry two pieces of luggage onto the plane. One regional airline is considering changing its policy to allow only one carry – on per passenger. Before doing so, it decided to collect some data. A random sample of size 1000 passengers was selected and number of bags carried on the plane was noted. 345 passengers had more than one bag. The domestic version of Boeing 747 has a capacity for 568 passengers. Determine a 95% confidence interval of the number of passengers that you expect to carry more than one piece of luggage on the plane. Assume the plane is at its passenger capacity

    a. Between 180 passengers and 213 passengers
    b. Between 182 passengers and 211 passengers
    c. Between 180 passengers and 218 passengers
    d. Between 177 passengers and 217 passengers.
    e. Between 186 passengers and 207 passengers.

23. 23A 90% confidence interval for the hours that college students sleep during the weekday is (6.8, 10.8). Given a definition of what it means to be “95% confident” as an inference

    a. We’re 90% confident that the mean number of hours of sleep that college students during a weekday is between 6.8 and 10.8 hours
    b. There is a 90% probability that the mean hours of sleep that college students get during a weekday is between 6.8 and 10.8 hours
    c. We’re 90% confident that the mean number of hours of sleep that college students get any day of the week is between 6.8 and 10.8 hours
    d. 90% of college students sleep between 6.8 and 10.8 hours
    e. There is no meaning of this interval.

24. 24If you are interesting for the difference between the means of two independent populations presuming equal variances with samples of size 20 each. The number of degrees of freedom is equal to

    a. 38
    b. 39
    c. 19
    d. 18
    e. We cannot tell

25. 25The marketing manager of a pharmaceutical company believes that more girls than boys use its acne medicine. In a recent survey, 2500 teenagers are asked whether or not they use that particular product. The responses, categorized by gender, are summarized below.

Gender	Use acne	Don't use acne
Female	540	810
Male	391	759

Estimate with 90% confidence the difference in the proportion of male and female users of the acne medicine.

a. Between 0.0282 and 0.0917
b. Between 0.0353 and 0.0847
c. Between 0.0221 and 0.0978
d. Between 0.0150 and 0.1049
e. Between 0.0103 and 0.1097

26. 26A plant manager has collected productivity data for a sample of workers, intending to see whether there is a difference in the number of units they produce on Monday versus Thursday. The results (units produced)

worker	1	2	3	4	5	6	7	8	9
Monday	49	56	63	52	47	69	71	54	42
Thursday	46	59	65	57	54	71	70	49	43

Given that standard deviation for the difference between the two sets is 3.767. Construct and interpret the 99% confidence interval for the mean difference in productivity between the days.

a. -1.22 ± 4.213
b. -1.22 ± 12.63
c. -1.22 ± 2.335
d. -1.22 ± 7.005
e. -1.22 ± 2.066

27. 27The prices of two competitive companies (Company I and Company II) need to be studied in order to have a comparative analysis between the two companies. The following prices data have been obtained for these two types of companies from a town market:

	Company I	Company II
The sample size	15	17
The sample mean	33.4	32.4
The sample standard deviation	1.3	1.5

Assuming both populations are approximately normal with equal variances, construct a 93% confidence interval for the difference between the true mean prices of two companies.

a. 1 ± 0.938
b. 1 ± 0.848
c. 1 ± 1.020
d. 1 ± 0.904
e. 1 ± 0.822

28. 28Eighty workers were randomly divided into two sets of forty each. Each set spent two weeks in a self - training program that was designed to teach a new production technique. The first set of workers was accompanied by a supervisor whose only job was to check that the workers were all paying attention. The second group was left on its own. After the program ended, the workers were tested. The following results were as follows:

	Sample Mean	Sample St. Dev.
Supervised group	70.6	8.4
Unsupervised group	77.4	7.4

Estimate the true difference between the two population means using 95% confidence interval.

a. 6.8 ± 3.469
b. 6.8 ± 2.911
c. 6.8 ± 2.265
d. 6.8 ± 4.124
e. 6.8 ± 3.204