King Fahd University of Petroleum and Minerals
Department of Mathematics
Stat 211
Final Exam
222
May 29, 2023
Net Time Allowed: 90 Minutes

USE THIS AS A TEMPLATE

Write your questions, once you are satisfied upload this file.

1. If $\bar{X} = 125$, $\sigma = 24$, and $n = 36$, then construct a 99% confidence interval estimate for the population mean

   (a) $114.68 \leq \mu \leq 135.32$
   (b) $83.04 \leq \mu \leq 86.96$
   (c) $114.68 \leq \mu \leq 183.47$
   (d) $86.96 \leq \mu \leq 135.32$
   (e) $83.04 \leq \mu \leq 114.68$

2. A paint manufacturer's specifications state that the standard deviation of the amount of paint is equal to 0.02 gallon. A random sample of 50 cans is selected, and the sample mean amount of paint per can is 0.995 gallon. To construct a 99% confidence interval estimate for the population mean amount of paint included in a can, what is the margin of error?

   (a) 0.0073
   (b) 0.0028
   (c) 0.0146
   (d) 0.9877
   (e) 0.0516

3. A stationery store wants to estimate the mean retail value of greeting cards that it has in its inventory. A random sample of 100 greeting cards indicates a mean value of $\$\,2.55$ and a standard deviation of $\$\,0.44$. Assuming a normal distribution, construct a 95% confidence interval estimate for the mean value of all greeting cards in the store's inventory.

   (a) $\$2.46 \leq \mu \leq \$2.64$
   (b) $\$2.46 \leq \mu \leq \$6.55$
   (c) $\$1.37 \leq \mu \leq \$7.62$
   (d) $\$1.37 \leq \mu \leq \$2.64$
   (e) $\$6.55 \leq \mu \leq \$7.62$

4. The following is the amount that a sample of nine customers spent for lunch ($) at a fast-food restaurant:

   4.20, 5.03, 5.86, 6.45, 7.38, 7.54, 8.46, 8.47, 9.87

   Find the width (range) of a 95% confidence interval estimate for the population mean amount spent for lunch ($) at a fast-food restaurant, assuming a normal distribution.

   (a) $\$\,2.78$
   (b) $\$\,7.03$
   (c) $\$\,1.39$
   (d) $\$\,5.64$
   (e) $\$\,0.60$

5. In a survey of 2,395 adults, 1,916 reported that e-mails are easy to misinterpret, but only 1,269 reported that telephone conversations are easy to misinterpret. Construct a 95 % confidence interval estimate for the population proportion of adults who report that e-mails are easy to misinterpret.

   (a) $0.7840 \leq \pi \leq 0.8160$
   (b) $0.7335 \leq \pi \leq 0.7865$
   (c) $0.4762 \leq \pi \leq 0.5638$
   (d) $0.7358 \leq \pi \leq 0.7842$
   (e) $0.2273 \leq \pi \leq 0.3245$

6. A market researcher selects a simple random sample of customers from a population of 2 million customers. After analyzing the sample, she states that she is 95% confident that the mean annual income of the 2 million customers is between $\$70,000$ and $\$85,000$. What is the value of the sample mean?

   (a) $\$77,500$
   (b) $\$80,000$
   (c) $\$83,000$
   (d) $\$77,000$
   (e) $\$75,000$

7. The data below is the overall miles per gallon (MPG) of 2010 small SUVs.

   24 21 23 24 34 34 34 20 20 22 22 44 32 20 20 22 20 39 20

   If a 95% confidence interval estimate for the population mean MPG of 2010 small SUVs, is (22.41205, 29.69321). 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 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

8. In a survey of 1,200 social media users, 76% said it is okay to friend co-workers, but 56% said it is not okay to friend your boss. What is the width of the 95% confidence interval for the population proportion of social media users who would say it is okay to friend co-workers?

   (a) 0.0483
   (b) 0.4830
   (c) 0.0242
   (d) 0.8083
   (e) 0.7117

9. **(Use Data 1)** What is the value of the pooled-variance to construct a 95% confidence interval estimate of the population mean difference between μ_1 and μ_2?

   (a) 22
   (b) 20
   (c) 21
   (d) 23
   (e) 24

10. **(Use Data 1)** In finding the critical value, how many degrees of freedom are there to construct a 95% confidence interval estimate of the population mean difference between μ_1 and μ_2?

    (a) 21
    (b) 20
    (c) 22
    (d) 23
    (e) 24

11. **(Use Data 1)** Construct a 95% confidence interval estimate of the population mean difference between μ_1 and μ_2.

    (a) 3.7288 to 12.2712
    (b) 4.7288 to 14.7625
    (c) 5.7288 to 10.8863
    (d) 2.5628 to 12.4098
    (e) 3.2091 to 13.6652

12. Let $n_1 = 100$, $X_1 = 45$, $n_2 = 50$, $X_2 = 25$. Construct a 99% confidence interval estimate for the difference between the two population proportions $\pi_1 - \pi_2$

    (a) $[-0.2727, 0.1727]$
    (b) $[-0.4451, 0.6549]$
    (c) $[-0.2727, -0.1727]$
    (d) $[-0.4451, -0.6549]$
    (e) $[-0.7528, 0.4372]$

13. **(Use Data 2)** To construct a 95% confidence interval estimate of the difference in the mean ratings between the two brands, what is the critical value?

(a) 2.306
(b) 2.896
(c) 2.101
(d) 2.110
(e) 1.860

14. **(Use Data 2)** The margin of error, for constructing 95% confidence interval estimate of the difference in the mean ratings between the two brands, is

(a) 1.0946
(b) 1.7577
(c) 1.8600
(d) 0.6743
(e) 2.0561

15. **(Use Data 2)** Construct a 95% confidence interval estimate of the difference in the mean ratings between the two brands.

(a) $[-2.6501, -0.4609]$
(b) $[-2.6501, 0.4609]$
(c) $[2.6501, 1.4609]$
(d) $[-0.4609, 0.4609]$
(e) $[2.6501, 3.4609]$

16. A survey of 500 shoppers was taken about consumer behavior. Among the questions asked was, "Do you enjoy shopping for clothing?". Of 240 males, 136 answered yes. Of 260 females, 224 answered yes. Construct a 99% confidence interval estimate for the difference between the proportions of males and females who enjoy shopping for clothing.

(a) $(-0.394, -0.195)$
(b) $(0.301, 0.399)$
(c) $(0.451, 0.612)$
(d) $(-0.612, -0.451)$
(e) $(-0.015, 0.201)$

17. An auditor for the Internal Revenue Service is selecting a sample of 6 tax returns for an audit. If 2 or more of these returns are "improper", then the entire population of 100 tax returns will be audited. What is the probability that the entire population will be audited if the true number of improper returns in the population is 25?

    (a) 0.4660
    (b) 0.5309
    (c) 0.3059
    (d) 0.6941
    (e) 0.6380

18. If the likelihood, of a tagged order form, is 0.1, what is the probability that there are three or more tagged order forms in the sample of four?

    (a) 0.0037
    (b) 0.0532
    (c) 0.9468
    (d) 0.9963
    (e) 0.0921

19. A statistical analysis of 1,000 long-distance telephone calls made from the headquarters of the Bricks and Clicks Computer Corporation indicates that the length of these calls is normally distributed, with $\mu = 240$ seconds and $\sigma = 40$ seconds. What is the probability that a call lasted less than 180 seconds?

    (a) 0.0668
    (b) 0.9332
    (c) Approximately 1
    (d) Approximately 0
    (e) 0.5123

20. Downloading an iPad game using a broadband connection should take 3 to 6 minutes. Assume that the download times are uniformly distributed between 3 and 6 minutes. If you download a game, what is the probability that the download time will be less than 3.3 minutes?

    (a) 0.1
    (b) 0.9
    (c) 0.255
    (d) 0.321
    (e) 1

21. Time spent using e-mail per session is normally distributed, with $\mu = 8$ minutes and $\sigma = 2$ minutes. If you select a random sample of 25 sessions, what is the probability that the sample mean is between 7.8 and 8.2 minutes?

(a) 0.3829
(b) 0.6914
(c) 0.3085
(d) 0.6171
(e) 0.0797

22. A political pollster is conducting an analysis of sample results in order to make predictions on election night. Assuming a two-candidate election, if a specific candidate receives at least 55% of the vote in the sample, that candidate will be forecast as the winner of the election. If you select a random sample of 100 voters, what is the probability that a candidate will be forecast as the winner when the population percentage of her vote is 50.1%?

(a) 0.1635
(b) 0.5601
(c) 0.3253
(d) 0.9290
(e) 0.0755

23. The following table shows the overall miles per gallon (MPG) of 2010 small SUVs:

24	23	22	21	22	22	18	18	26
26	26	19	19	19	21	21	21	21
21	18	19	21	22	22	16	16	

Given that $\sum_{i=1}^{26} x = 544$ and $\sum_{i=1}^{26} x^2 = 11568$, the mean and standard deviation, respectively, are:

(a) 20.9231 & 2.7265
(b) 21 & 7.4338
(c) 29.9231 & 2.7265
(d) 20.9231 & 7.4338
(e) 21 & 2.7265

24. Consider the following contingency table:

	B	B'
A	10	20
A'	20	40

What is the probability of $A'|B$?

(a) 0.6667
(b) 0.3333
(c) 0.5
(d) 0.9898
(e) 0.25