

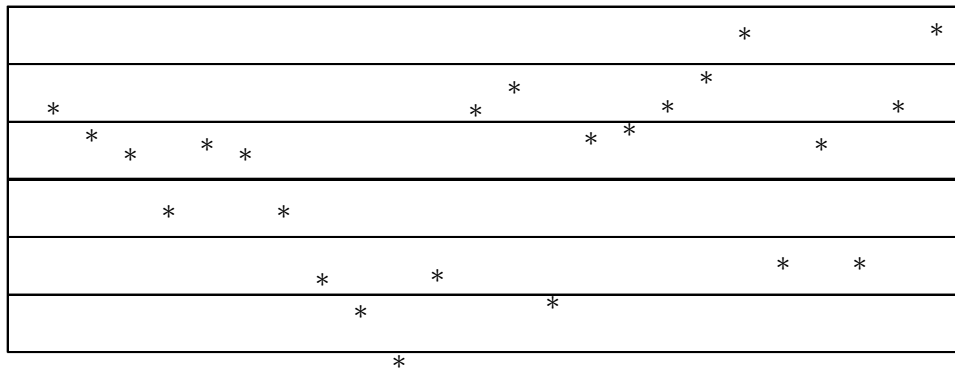
Answer all questions by marking the scantron. Write your name and the last four digits of your social security number both on the scantron and on the exam. You may write on the exam. Good Luck!

The following table includes data about four experiments. You are requested to perform a *two-way* ANOVA test.

4	12	36	16
12	18	30	16

- Find the grand mean ($\bar{\bar{x}}$).
a. 17 b. 18 c. 19 d. 20 e. none of the above
- Find the sum of squares of treatments.
a. 60 b. 92 c. 324 d. 676 e. none of the above
- Find the sum of squares of errors.
a. 60 b. 92 c. 324 d. 676 e. none of the above
- Find the mean squares of treatments.
a. 10 b. 20 c. 30.7 d. 225.3 e. none of the above
- Find the mean squares of errors.
a. 10 b. 20 c. 30.7 d. 225.3 e. none of the above
- Find the F statistic.
a. 7.35 b. 9.28 c. 11.27 d. 29.46 e. none of the above
- Find the 95% confidence critical value.
a. 7.35 b. 9.28 c. 11.27 d. 29.46 e. none of the above
- Are at least two means different from one another with 95% confidence?
a. Yes b. No c. Inconclusive d. None of the above
- Are at least two means different from one another with 99% confidence?
a. Yes b. No c. Inconclusive d. None of the above

The following is an X-bar chart. Refer to it in answering questions 9-13.



10. How many times is Rule 1 invoked in the above diagram?
a. none b. once c. twice d. three times e. more than three times
11. How many times is Rule 2 invoked in the above diagram?
a. none b. once c. twice d. three times e. more than three times
12. How many times is Rule 3 invoked in the above diagram?
a. none b. once c. twice d. three times e. more than three times
13. How many times is Rule 5 invoked in the above diagram?
a. none b. once c. twice d. three times e. more than three times
14. How many times is Rule 6 invoked in the above diagram?
a. none b. once c. twice d. three times e. more than three times

You are asked to check whether Brand B cars have a higher mileage than Brand A cars. You checked the mileage of 15 brand A cars and found an average of 28.6 with a standard deviation of 3.2. The mileage of 8 brand B cars averaged 30.2 with a standard deviation of 1.7.

15. Find the upper limit of the 90% confidence interval for the difference between Brand A cars minus brand B cars.
a. 0.21 b. 0.55 c. 0.08 d. 0.50 e. none of the above
16. Find the lower limit of the 90% confidence interval for the difference between Brand A cars minus brand B cars.
a. -3.28 b. -3.70 c. -3.41 d. -3.75 e. none of the above

You are asked to check whether Brand B cars have a higher mileage than Brand A cars with 90% confidence.

17. Find the statistic:
a. 1.29 b. 1.31 c. 1.45 d. 1.57 e. none of the above
18. Find the critical value:
a. 1.282 b. 1.330 c. 1.323 d. 1.645 e. none of the above
19. Can you say with 90% confidence that Brand B cars have a higher mileage than Brand A cars?
a. Yes b. No c. Inconclusive d. None of the above
20. What is the significance (p-value) of the test?
a. 0.0735 b. 0.0582 c. 0.0684 d. cannot be determined accurately by the tables in the book
e. none of the above

You are asked to check whether Brand B cars have a higher mileage than Brand A cars. For many years Brand A car had a standard deviation of 3.2 and Brand B cars had a standard deviation of 1.7. You checked the mileage of 15 brand A cars and found an average of 28.6. The mileage of 8 brand B cars averaged 30.2.

21. Find the upper limit of the 90% confidence interval for the difference between Brand A cars minus brand B cars.
a. 0.21 b. 0.55 c. 0.08 d. 0.50 e. none of the above
22. Find the lower limit of the 90% confidence interval for the difference between Brand A cars minus brand B cars.
a. -3.28 b. -3.70 c. -3.41 d. -3.75 e. none of the above

You are asked to check whether Brand B cars have a higher mileage than Brand A cars with 90% confidence.

23. Find the statistic:
a. 1.29 b. 1.31 c. 1.45 d. 1.57 e. none of the above
24. Find the critical value:
a. 1.282 b. 1.330 c. 1.323 d. 1.645 e. none of the above
25. Can you say with 90% confidence that Brand B cars have a higher mileage than Brand A cars?
a. Yes b. No c. Inconclusive d. None of the above
26. What is the significance (p-value) of the test?
a. 0.0735 b. 0.0582 c. 0.0684 d. cannot be determined accurately by the tables in the book
e. none of the above

There are concerns that this year there are more cases of the flu than last year. Last year you interviewed 400 people and 72 of them had the flu. This year you interviewed 500 people and 125 had the flu.

27. Find the upper limit of the 95% confidence interval for the difference between flu proportion this year minus last year.
a. 0.093 b. 0.103 c. 0.113 d. 0.123 e. none of the above
28. Find the lower limit of the 95% confidence interval for the difference between flu proportion this year minus last year.
a. -0.003 b. 0.003 c. -0.017 d. 0.017 e. none of the above

You are asked to check whether there is an increase in flu cases.

29. Find the statistic:
a. 1.84 b. 2.08 c. 2.33 d. 2.52 e. none of the above
30. Find the critical value:
a. 1.645 b. 1.282 c. 1.960 d. 2.326 e. none of the above
31. Can you say with 95% confidence that there is an increase in flu cases?
a. Yes b. No c. Inconclusive d. None of the above
32. What is the significance (p-value) of the test?
a. 0.0059 b. 0.0118 c. 0.0329 d. cannot be determined accurately by the tables in the book
e. none of the above
33. Can you say with 99% confidence that there is an increase in flu cases?
a. Yes b. No c. Inconclusive d. None of the above
34. Can you say with 90% confidence that there is an increase in flu cases?
a. Yes b. No c. Inconclusive d. None of the above

You can drive to work either on side streets or on the freeway. You recorded the driving time on side streets for 7 days and found an average of 25 minutes with a standard deviation of 3 minutes. You then measured 9 days driving on the freeway and the average was 17 minutes but with a standard deviation of 9 minutes.

35. Find the upper limit of the 95% confidence interval for the difference in driving time (freeway minus side streets).
a. 1.65 b. 0.29 c. -0.35 d. -1.71 e. none of the above

36. Find the lower limit of the 95% confidence interval for the difference in driving time (freeway minus side streets).
- a. -14.29 b. -15.65 c. -12.29 d. -13.65 e. none of the above

You are asked to check whether it is faster to go on the freeway with 95% confidence.

37. Find the statistic:
- a. 1.68 b. 1.87 c. 2.24 d. 2.49 e. none of the above
38. Find the critical value:
- a. 1.645 b. 1.761 c. 1.960 d. 2.145 e. none of the above
39. Can you say with 95% confidence that driving on the freeway is faster?
- a. Yes b. No c. Inconclusive d. None of the above
40. What is the significance (p-value) of the test?
- a. 0.0307 b. 0.0064 c. 0.0128 d. cannot be determined accurately by the tables in the book
e. none of the above