

1. The following data are from a completely randomized design.

	Treatment		
	A	B	C
	162	142	126
	142	156	122
	165	124	138
	145	142	140
	148	136	150
	174	152	128
Sample mean	156	142	134
Sample variance	164.4	131.2	110.4

- Compute the sum of squares between treatments.
- Compute the mean square between treatments.
- Compute the sum of squares due to error.
- Compute the mean square due to error.
- Set up the ANOVA table for this problem.
- At the  $\alpha = .05$  level of significance, test whether the means for the three treatments are equal.

12. **Restaurant Satisfaction.** The *Consumer Reports* Restaurant Customer Satisfaction Survey is based upon 148,599 visits to full-service restaurant chains (*Consumer Reports* website, <https://www.consumerreports.org/cro/restaurants/buying-guide/index.htm>). One of the variables in the study is meal price, the average amount paid per

person for dinner and drinks, minus the tip. Suppose a reporter for the *Sun Coast Times* thought that it would be of interest to her readers to conduct a similar study for restaurants located on the Grand Strand section in Myrtle Beach, South Carolina. The reporter selected a sample of 8 seafood restaurants, 8 Italian restaurants, and 8 steakhouses. The following data show the meal prices (\$) obtained for the 24 restaurants sampled. Use  $\alpha = .05$  to test whether there is a significant difference among the mean meal price for the three types of restaurants.

Italian	Seafood	Steakhouse
\$12	\$16	\$24
13	18	19
15	17	23
17	26	25
18	23	21
20	15	22
17	19	27
24	18	31

13. The following data are from a completely randomized design.

	Treatment A	Treatment B	Treatment C
	32	44	33
	30	43	36
	30	44	35
	26	46	36
	32	48	40
Sample mean	30	45	36
Sample variance	6.00	4.00	6.50

- At the  $\alpha = .05$  level of significance, can we reject the null hypothesis that the means of the three treatments are equal?
  - Use Fisher's LSD procedure to test whether there is a significant difference between the means for treatments A and B, treatments A and C, and treatments B and C. Use  $\alpha = .05$ .
  - Use Fisher's LSD procedure to develop a 95% confidence interval estimate of the difference between the means of treatments A and B.
17. **Marketing Ethics.** In the digital age of marketing, special care must be taken to make sure that programmatic ads appearing on websites align with a company's strategy, culture and ethics. For example, in 2017, Nordstrom, Amazon and Whole Foods each faced boycotts from social media users when automated ads for these companies showed up on the Breitbart website (*ChiefMarketer.com*). It is important for marketing professionals to understand a company's values and culture. The following data are from an experiment designed to investigate the perception of corporate ethical values among individuals specializing in marketing (higher scores indicate higher ethical values).

Marketing Managers	Marketing Research	Advertising
6	5	6
5	5	7
4	4	6
5	4	5
6	5	6
4	4	6

- Use  $\alpha = .05$  to test for significant differences in perception among the three groups.
- At the  $\alpha = .05$  level of significance, we can conclude that there are differences in the perceptions for marketing managers, marketing research specialists, and advertising specialists. Use the procedures in this section to determine where the differences occur. Use  $\alpha = .05$ .

21. Consider the experimental results for the following randomized block design. Make the calculations necessary to set up the analysis of variance table.

		Treatments		
		A	B	C
Blocks	1	10	9	8
	2	12	6	5
	3	18	15	14
	4	20	18	18
	5	8	7	8

Use  $\alpha = .05$  to test for any significant differences.

26. **SAT Performance.** The Scholastic Aptitude Test (SAT) contains three areas: critical reading, mathematics, and writing. Each area is scored on an 800-point scale. A sample of SAT scores for six students follows.

Student	Critical Reading	Mathematics	Writing
1	526	534	530
2	594	590	586
3	465	464	445
4	561	566	553
5	436	478	430
6	430	458	420

- Using a .05 level of significance, do students perform differently on the three areas of the SAT?
- Which area of the test seems to give the students the most trouble? Explain.