

## Chapter Quick Quiz

**1. Measures of Voltage** The author measured voltage amounts from three different sources: (1) electricity supplied directly to the author's home, (2) an independent gas-powered Generac generator (model PP 5000), and (3) an uninterruptible power supply (APC model CS 350) connected to the author's home power supply. The results from analysis of variance are shown below. What is the null hypothesis for this analysis of variance test? What specific result is used in deciding to reject  $H_0$  or fail to reject  $H_0$ ? Based on the displayed results, should you reject  $H_0$  or fail to reject  $H_0$ ?

### MINITAB

| Source | DF  | SS      | MS      | F      | P     |
|--------|-----|---------|---------|--------|-------|
| Factor | 2   | 28.8167 | 14.4083 | 183.01 | 0.000 |
| Error  | 117 | 9.2112  | 0.0787  |        |       |
| Total  | 119 | 38.0279 |         |        |       |

- Based on the conclusion from Exercise 1, can electrical appliances be expected to behave the same way when run from the three different power sources? Why or why not?
- For the analysis of variance test described in Exercise 1, is that test left-tailed, right-tailed, or two-tailed?
- Identify the value of the test statistic in the display included with Exercise 1. In general, do larger test statistics result in larger  $P$ -values, smaller  $P$ -values, or  $P$ -values that are unrelated to the value of the test statistic?
- The displayed result from Exercise 1 are from one-way analysis of variance. What is it about that test that characterizes it as one-way analysis of variance instead of two-way analysis of variance?
- In general, what is one-way analysis of variance used for?
- What is the fundamental difference between one-way analysis of variance and two-way analysis of variance?
- Given below is a Minitab display resulting from two-way analysis of variance with sample data consisting of 18 different student estimates of the length of a classroom. The values are categorized according to sex and major (math, business, liberal arts). What do you conclude about an interaction between sex and major?

### MINITAB

| Source      | DF | SS      | MS      | F    | P     |
|-------------|----|---------|---------|------|-------|
| Sex         | 1  | 29.389  | 29.3889 | 0.78 | 0.395 |
| Major       | 2  | 10.111  | 5.0556  | 0.13 | 0.876 |
| Interaction | 2  | 14.111  | 7.0556  | 0.19 | 0.832 |
| Error       | 12 | 453.333 | 37.7778 |      |       |
| Total       | 17 | 506.944 |         |      |       |

- Using the same results given in Exercise 8, does it appear that the length estimates are affected by the sex of the subject?
- Using the same results given in Exercise 8, does it appear that the length estimates are affected by the subject's major?