**10.30** In Dallas, some fire trucks were painted yellow (instead of red) to heighten their visibility. During

a test period, the fleet of red fire trucks made 153,348 runs and had 20 accidents, while the fleet of

yellow fire trucks made 135,035 runs and had 4 accidents. At *α* = .01, did the yellow fire trucks

have a significantly lower accident rate? (a) State the hypotheses. (b) State the decision rule and

sketch it. (c) Find the sample proportions and *z* test statistic. (d) Make a decision. (e) Find the

*p*-value and interpret it. (f ) If statistically significant, do you think the difference is large enough to

be important? If so, to whom, and why? (g) Is the normality assumption fulfilled? Explain.

Source: *The Wall Street Journal,* June 26, 1995, p. B1.

**Accident Rate for Dallas Fire Trucks**

*Statistic Red Fire Trucks Yellow Fire Trucks*

Number of accidents *x*1= 20 accidents *x*2= 4 accidents

Number of fire runs *n*1= 153,348 runs *n*= 135,035 runs

**10.44** Does lovastatin (a cholesterol-lowering drug) reduce the risk of heart attack? In a Texas study,

researchers gave lovastatin to 2,325 people and an inactive substitute to 2,081 people (average age

58). After 5 years, 57 of the lovastatin group had suffered a heart attack, compared with 97 for the

inactive pill. (a) State the appropriate hypotheses. (b) Obtain a test statistic and *p*-value. Interpret

the results at *α* = .01. (c) Is normality assured? (d) Is the difference large enough to be important?

(e) What else would medical researchers need to know before prescribing this drug widely? (Data

are from *Science News* 153 [May 30, 1998], p. 343.)

**10.46** To test the hypothesis that students who finish an exam first get better grades, Professor Hardtack

kept track of the order in which papers were handed in. The first 25 papers showed a mean score of

77.1 with a standard deviation of 19.6, while the last 24 papers handed in showed a mean score of

69.3 with a standard deviation of 24.9. Is this a significant difference at *α* = .05? (a) State the

hypotheses for a right-tailed test. (b) Obtain a test statistic and *p*-value assuming equal variances.

Interpret these results. (c) Is the difference in mean scores large enough to be important? (d) Is it reasonable

to assume equal variances? (e) Carry out a formal test for equal variances at *α* = .05, showing

all steps clearly.

**10.56** A sample of 25 concession stand purchases at the October 22 matinee of *Bride of Chucky* showed

a mean purchase of $5.29 with a standard deviation of $3.02. For the October 26 evening showing

of the same movie, for a sample of 25 purchases the mean was $5.12 with a standard deviation of

$2.14. The means appear to be very close, but not the variances. At *α* = .05, is there a difference

in variances? Show all steps clearly, including an illustration of the decision rule. (Data are from

a project by statistics students Kim Dyer, Amy Pease, and Lyndsey Smith.)

**11.24** In a bumper test, three types of autos were deliberately crashed into a barrier at 5 mph, and the

resulting damage (in dollars) was estimated. Five test vehicles of each type were crashed, with

the results shown below. *Research question:* Are the mean crash damages the same for these three

vehicles?

**Crash Damage ($)**

*Goliath Varmint Weasel*

1,600 1,290 1,090

760 1,400 2,100

880 1,390 1,830

1,950 1,850 1,250

1,220 950 1,920