11-3 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. Smoking Cessation The accompanying table summarizes successes and failures when subjects used different methods when trying to stop smoking. The determination of smoking or not smoking was made five months after the treatment was begun, and the data are based on results from the Centers for Disease Control and Prevention. If we test the claim that success is independent of the method used, the TI-83/84 Plus calculator provides a *P*-value of 0.216 (rounded). What does the *P*-value tell us about that claim?

	Nicotine Gum	Nicotine Patch	Nicotine Inhaler
Smoking	191	263	95
Not Smoking	59	57	27

2. Terminology The table in Exercise 1 is called a contingency table or two-way table. Why is the term *contingency* used? Why is the terminology of *two-way* table used?

3. Degrees of Freedom and Critical Value For the hypothesis test in Exercise 1, the test statistic is 3.062. Find the number of degrees of freedom used to find the critical value, then find the critical value. Assume a 0.05 significance level.

4. Right-Tailed, Left-Tailed, Two-Tailed Is the hypothesis test in Exercise 1 right-tailed, left-tailed, or two-tailed? Explain your choice.

In Exercises 5–18, test the given claim.

5. Denomination Effect In a study of the "denomination effect" described in the Chapter Problem, 150 women in China were given either a single 100 Yuan bill or a total of 100 Yuan in smaller bills. The value of 100 Yuan is about $15. The women were given the choice of spending the money on specific items or they could keep the money. The results are summarized in the table below, and STATDISK results are provided in the screen display. Use a 0.05 significance level to test the claim that the form of the 100 Yuan is independent of whether the money was spent. What does the result suggest about a denomination effect?

	Spent the Money	Kept the Money
Women Given a Single 100-Yuan Bill	60	15
Women Given 100 Yuan in Smaller Bills	68	7

STATDISK

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Test Statistic, X^2:  3.4091
Critical X^2:         3.841456
P-Value:              0.0648
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6. Which Treatment Is Better? A randomized controlled trial was designed to compare the effectiveness of splinting versus surgery in the treatment of carpal tunnel syndrome. Results are given in the table below (based on data from "Splinting vs. Surgery in the Treatment of Carpal Tunnel Syndrome," by Gerritsen et al., *Journal of the American Medical Association*, Vol. 288, No. 10). The results are based on evaluations made one year after the treatment. Minitab results are given below the table. Using a 0.01 significance level, test the claim that success is independent of the type of treatment. What do the results suggest about treating carpal tunnel syndrome?

	Successful Treatment	Unsuccessful Treatment
Splint Treatment	60	23
Surgery Treatment	67	6

MINITAB

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Chi-Sq = 9.750, DF = 1, P-Value = 0.002
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