R10.2. **Seat belt use** The proportion of drivers who use seat belts depends on things like age (young people are more likely to go unbelted) and gender (women are more likely to use belts). It also depends on local law. In New York City, police can stop a driver who is not belted. In Boston at the time of the study, police could cite a driver for not wearing a seat belt only if the driver had been stopped for some other violation. Here are data from observing random samples of female Hispanic drivers in these two cities:[47]

City	Drivers	Belted
New York	220	183
Boston	117	68

(a) Is this an experiment or an observational study? Why?

(b) Construct and interpret a 95% confidence interval for the difference in the proportions of female Hispanic drivers in the two cities who wear seat belts.

(c) Based on the laws in the two cities, we would expect a smaller proportion of drivers to wear seat belts in Boston than in New York. Does the confidence interval in part (b) give good evidence that this is true for female Hispanic drivers? Justify your answer.

Skittles Statistics teacher Jason Molesky contacted Mars, Inc., to ask about the color distribution for Skittles candies. Here is an excerpt from the response he received: "The original flavor blend for the SKITTLES BITE SIZE CANDIES is lemon, lime, orange, strawberry and grape. They were chosen as a result of consumer preference tests we conducted. The flavor blend is 20 percent of each flavor."

(a) State appropriate hypotheses for a significance test of the company's claim.

(b) Find the expected counts for a bag of Skittles with 60 candies.

R10.4. **Men versus women** The National Assessment of Educational Progress (NAEP) Young Adult Literacy Assessment Survey interviewed a random sample of 1917 people 21 to 25 years old. The sample contained 840 men and 1077 women.[49] The mean and standard deviation of scores on the NAEP's test of quantitative skills were $\bar{x}_1 = 272.40$ and $s_1 = 59.2$ for the men in the sample. For the women, the results were $\bar{x}_2 = 274.73$ and $s_2 = 57.5$. Is the difference between the mean scores for men and women significant at the 1% level? Give appropriate statistical evidence to justify your answer.

R10.5. **Treating AIDS** The drug AZT was the first drug that seemed effective in delaying the onset of AIDS. Evidence for AZT's effectiveness came from a large randomized comparative experiment. The subjects were 870 volunteers who were infected with HIV, the virus that causes AIDS, but did not yet have AIDS. The study assigned 435 of the subjects at random to take 500 milligrams of AZT each day and another 435 to take a placebo. At the end of the study, 38 of the placebo subjects and 17 of the AZT subjects had developed AIDS.

(a) Researchers want to test the claim that taking AZT lowers the proportion of infected people who will develop AIDS in a given period of time. Carry out a test of this claim at the $\alpha = 0.05$ level.

90. **Floral scents and learning** We hear that listening to Mozart improves students' performance on tests. Maybe pleasant odors have a similar effect. To test this idea, 21 subjects worked two different but roughly equivalent paper-and-pencil mazes while wearing a mask. The mask was either unscented or carried a floral scent. Each subject used both masks, in a random order. The table below gives the subjects' times with both masks.[31]

Subject	Unscented	Scented
1	30.60	37.97
2	48.43	51.57
3	60.77	56.67
4	36.07	40.47
5	68.47	49.00
6	32.43	43.23
7	43.70	44.57
8	37.10	28.40
9	31.17	28.23
10	51.23	68.47
11	65.40	51.10
12	58.93	83.50
13	54.47	38.30
14	43.53	51.37
15	37.93	29.33
16	43.50	54.27
17	87.70	62.73
18	53.53	58.00
19	64.30	52.40
20	47.37	53.63
21	53.67	47.00

(a) Explain why it was important to randomly assign the order in which each subject used the two masks.

(b) Do these data provide convincing evidence that the floral scent improved performance? Carry out an appropriate test to support your answer.

R11.5. **Popular kids** Who were the popular kids at your elementary school? Did they get good grades or have good looks? Were they good at sports? A study was performed to examine the factors that determine social status for children in grades 4, 5, and 6. Researchers administered a questionnaire to a random sample of 478 students in these grades. One of the questions they asked was "What would you most like to do at school: make good grades, be good at sports, or be popular?" The two-way table below summarizes the students' responses.[38]

Gender	Goal		
	Grades	Popular	Sports
Female	130	91	30
Male	117	50	60

(a) Construct an appropriate graph to compare male and female responses. Write a few sentences describing the relationship between gender and goals.

(b) Is there convincing evidence of an association between gender and goals for elementary school students? Carry out a test at the $\alpha = 0.05$ level and report your conclusion.