

E Chapter 11 Exercises

Perform each of the following tests. Assume that the necessary criteria are met for each scenario.

- Psychologists believe that test anxiety can reduce a student's score on an exam. An educational psychologist administers a test to two groups of students, one group that has test anxiety and one group that does not. Use the information in the following table to test the psychologists' claim at the 0.05 level of significance.

Test Scores			
	n	\bar{x}	σ
With Test Anxiety	35	65.9	8.9
Without Test Anxiety	38	73.2	11.5

- A company that manufactures baseball bats believes that its new bat will allow players to hit the ball more than 30 feet farther, on average, than its current model. The managers hire a professional baseball player known for hitting home runs to hit 10 balls with each bat and they measure the distance each ball is hit to test their claim. The results of the batting experiment are shown below. Test the company's claim using a 0.05 level of significance. Assume that the variances of the two populations are equal.

Baseball Hitting Distances (in Feet)	
New Model	Old Model
235	200
240	210
253	231
267	218
243	210
237	209
250	210
241	229
251	234
248	231

- For male and female married couples, do husbands gain more weight after marriage than their wives? Answer this question by performing a hypothesis test using a 0.05 level of significance. Data on the amount of weight gained during the first year of marriage were collected from 10 couples and are given in the following table. Negative values indicate weight lost.

Weight Gained (in Pounds)										
Husband	10	15	8	7	3	10	12	20	-5	4
Wife	11	8	4	2	-1	8	15	15	-10	3

4. A blackjack pit boss at a casino is concerned that one of the tables is not generating the same revenue, on average, as the other three tables. The amount of revenue (in whole dollars) received during one particular three-hour period is recorded at each table each night for five nights. The results are given in the table below. Based on these data, can the pit boss conclude that at least one of the tables is not generating the same mean revenue as the other tables? Use a 0.05 level of significance.

Revenue (in Dollars)			
Table 1	Table 2	Table 3	Table 4
8534	9821	10,542	7367
7845	8997	9982	8021
8901	7905	8934	9034
9371	8923	9344	6703
7782	6675	8745	8432

5. The company manufacturing a new antibiotic ointment claims that it speeds healing time for minor cuts and scrapes. To test this claim, a researcher conducts an experiment involving 30 participants who have recently suffered a minor cut or scrape. Half of the group is asked to apply the new ointment twice daily, and the other half of the group is not allowed to treat the cuts with any medication. The researcher tracks the length of time it takes for each cut to heal. The cuts treated with the new ointment took a mean of 4.6 days to heal, with a standard deviation of 1.3 days. The cuts that did not receive treatment took a mean of 6.1 days to heal, with a standard deviation of 1.6 days. Test the company's claim at the 0.01 level of significance. Assume that the population variances are not equal.
6. Are people with low incomes more likely to cheat on their taxes than people with high incomes? To test this claim, a researcher anonymously surveys 50 taxpayers with low annual incomes and 50 taxpayers with high annual incomes. Of those with low incomes, 7 admit that they were not completely honest on their most recent federal income tax returns. Of those with high incomes, 5 admit that they were not entirely honest on their most recent federal income tax returns. Evaluate the claim by performing a hypothesis test at the 0.05 level of significance.
7. An education professor believes that a new teaching pedagogy will change the number of disciplinary problems that occur in the classroom. For her study, the professor randomly selects 10 students from one elementary school. For one month, the students are taught using the new pedagogy. The next month, the students are taught without changing the pedagogy. For each month, the number of times that each student was disciplined is recorded. Test the professor's claim at the 0.01 level of significance.

Number of Times Disciplined										
Single-Gender Class	1	2	0	4	3	6	1	2	0	0
Mixed-Gender Class	2	2	1	6	3	9	0	4	0	1

8. Are people who live in Atlanta more likely to own a pet than people who live in Chicago? A survey of 50 Atlantians found that 37 of them own a pet. A survey of 55 fathers found that 35 of them are pet owners. Answer the question by performing a hypothesis test using a 0.05 level of significance.
9. A psychologist is convinced that attitude plays a central role in health. Along those lines, he believes that people who attend church regularly are healthier. The psychologist decides to test his claim by comparing the mean number of doctor's visits per year, excluding routine checkups, for adults who attend church regularly and those who do not. To test his claim, he randomly selects 75 adults who regularly attend church and finds that in the past year they had a mean of 1.4 doctor's visits. Assume that the population standard deviation for adults who regularly attend church is known to be 0.4 doctor's visits per year. He also randomly selects 75 adults who do not regularly attend church, and he finds that in the past year they had a mean of 1.6 doctor's visits. Assume that the population standard deviation for adults who do not regularly attend church is known to be 0.5 doctor's visits per year. Use the 0.05 level of significance to test this claim.
10. A nutritionist believes that the variance of the weights, measured in pounds, of people on diets is less than the variance of the weights of the general population. The sample variance for a sample of 15 people on diets is 256.02. The sample variance for a sample of 15 random people is 367.91. Test the nutritionist's claim using a 0.05 level of significance. Does the evidence support the nutritionist's claim?