

Section 10.1

Example The average amount of time boys and girls ages 7 through 11 spend playing sports each day is believed to be the same. An experiment is done, data is collected, resulting in the table below. Both populations have a normal distribution.

	Sample Size	Average Number of Hours Playing Sports Per Day	Sample Standard Deviation
Girls	9	2 hours	$\sqrt{.75}$
Boys	16	3.2 hours	1.00

Is there a difference in the mean amount of time boys and girls ages 7 through 11 play sports each day? Test at the 5% level of significance.

Example The numbers of raisins in each of 14 mini-boxes (1/2 ounce) were counted for a generic brand and Sunmaid brand raisins. Assume that raisin counts are approximately normally distributed for both generic brand and Sunmaid brand raisins.

	Generic	Sunmaid
Sample Mean	25.2	26.8
Sample Standard Deviation	1.2	0.9
Sample Size	14	14

Do the data indicate that there is a difference in the mean number of raisins per mini-box? Use $\alpha = .05$.

Example To compare the starting salaries of college graduates majoring in engineering and computer science, random samples of 50 recent college graduates in each major were selected and the following information was obtained. Assume that the samples are independent.

Major	Sample Mean	Sample Standard Deviation
Engineering	\$53659	\$2225
Computer Science	\$51042	\$2375

Do the data indicate that recent college graduates who majored in engineering receive, on average, a higher starting salary? Use $\alpha = .05$.

Section 10.2

Example The mean lasting time of 2 competing floor waxes is to be compared. Twenty floors are randomly assigned to test each wax. Both populations have a normal distribution. The following table is the result.

Wax	Sample Mean Number of Months Floor Wax Lasts	Population Standard Deviation
1	3	.33
2	2.9	.36

Does the data indicate that wax 1 is more effective than wax 2? Test at a 5% level of significance.

Example Do women talk more than men? A recent study equipped random samples of men and women with a small recording device that secretly recorded sound. From that, the number of words spoken for a day was determined.

	Women	Men
Mean	16496	12867
Population Standard Deviation	7914	8001
Sample Size	27	20

Assume that the parent populations are normal. Do the data indicate that women talk more than men, on average? Test using $\alpha = 5\%$.

Section 10.3

Example Generally speaking, would you say that most people can be trusted? A random sample of 250 people in Chicago ages 18 - 25 showed that 45 said "yes." Another random sample of 280 people in Chicago ages 35 - 45 showed that 71 said "yes." Does this indicate that the population proportion of trusting people in Chicago is lower for the younger group? Test using a 5% level of significance.

Example Two types of medication for hives are being tested to determine if there is a difference in the proportions of adult patient reactions. Twenty out of a random sample of 200 adults given medication A still had hives 30 minutes after taking the medication. Twelve out of another random sample of 200 adults given medication B still had hives 30 minutes after taking the medication. Test at a 1% level of significance.

Section 10.4

Example In response to a complaint that a particular tax assessor (A) was biased, an experiment was conducted to compare the assessor named in the complaint with another tax assessor (B) from the same office. Six properties were randomly selected, and each was assessed by both assessors. The assessments (in thousands of dollars) are shown in the table.

	Property 1	Property 2	Property 3	Property 4	Property 5	Property 6
A	555.4	660.7	723.2	800.1	690.5	615.3
B	550.1	650.2	721.5	802.3	675.2	612.4

Do the data provide sufficient evidence to indicate that assessor A gives higher assessments than assessor B, on average? Use a 5% level of significance.

Example As part of her class project, a student randomly sampled ten students to investigate their most common social activities. As part of the study, she asked each student how many times last year they went to a movie and how many times they went to a party.

Student	1	2	3	4	5	6	7	8	9	10
Movie	20	5	4	2	1	7	11	1	14	3
Party	25	10	6	2	5	10	15	2	15	4

At a 5% level of significance, do the data show a difference in the number of movies and parties students attend per year, on average?

Section 10.5

Example The popular disinfectant Listerine is named after Joseph Lister, a British physician who pioneered the use of antiseptics. Lister conjectured that human infections might have an organic origin and thus could be prevented by using a disinfectant. Over a period of several years, he performed 75 amputations: 40 using carbolic acid as a disinfectant and 35 without any disinfectant. The following results were obtained:

	Patient Survived	Patient Died	Total
With Carbolic Acid	34	6	40
Without Carbolic Acid	19	16	35

At a 1% level of significance, does it appear that patients have a higher survival rate when Carbolic Acid is used as an antiseptic?

Example A study was conducted to investigate the effectiveness of hypnotism in reducing pain. Results for randomly selected subjects are shown in the table. The "before" value is matched to an "after" value and the differences are calculated. The differences have a normal distribution.

Subject:	A	B	C	D	E	F	G	H
Before	6.6	6.5	9.0	10.3	11.3	8.1	6.3	11.6
After	6.8	2.4	7.4	8.5	8.1	6.1	3.4	2.0

Are the sensory measurements, on average, lower after hypnotism? Test at a 5% significance level.