City A				City B			
113	22	14	8	82	11	5	15
25	23	23	30	295	50	12	9
44	11	19	7	12	68	81	2
31	19	5	2	20	16	4	5

3. Noise Levels in Hospitals The mean noise level of 20 areas designated as "casualty doors" was 63.1 dBA, and the standard deviation is 4.1 dBA. The mean noise level for 24 areas designated as operating theaters was 56.3 dBA, and the standard deviation was 7.5 dBA. At $\alpha = 0.05$, can it be concluded that there is a difference in the means?

4. Ages of Gamblers The mean age of a sample of 25 people who were playing the slot machines is 48.7 years, and the standard deviation is 6.8 years. The mean age of a sample of 35 people who were playing roulette is 55.3 with a standard deviation of 3.2 years. Can it be concluded at $\alpha = 0.05$ that the mean age of those playing the slot machines is less than those playing roulette?

5. Carbohydrates in Candies The number of grams of carbohydrates contained in 1-ounce servings of randomly selected chocolate and nonchocolate candy is listed here. Is there sufficient evidence to conclude that the difference in the means is significant? Use $\alpha = 0.10$.

Chocolate:	29	25	17	36	41	25	32	29
	38	34	24	27	29			
Nonchocolate:	41	41	37	29	30	38	39	10
	29	55	29					

Source: *The Doctor's Pocket Calorie, Fat, and Carbohydrate Counter.*

6. Teacher Salaries A researcher claims that the mean of the salaries of elementary school teachers is greater than the mean of the salaries of secondary school teachers in a large school district. The mean of the salaries of a sample of 26 elementary school teachers is $48,256, and the sample standard deviation is $3,912.40. The mean of the salaries of a sample of 24 secondary school teachers is $45,633. The standard deviation is $5,533. At $\alpha = 0.05$, can it be concluded that the mean of the salaries of the elementary school teachers is greater than the mean of the salaries of the secondary school teachers? Use the *P*-value method.

7. Weights of Running Shoes The weights in ounces of a sample of running shoes for men and women are shown. Test the claim that the means are different. Use the *P*-value method with $\alpha = 0.05$.

Men		Women		
10.4	12.6	10.6	10.2	8.8
11.1	14.7	9.6	9.5	9.5
10.8	12.9	10.1	11.2	9.3
11.7	13.3	9.4	10.3	9.5
12.8	14.5	9.8	10.3	11.0

8. Weights of Vacuum Cleaners Upright vacuum cleaners have either a hard body type or a soft body type. Shown are the weights in pounds of a sample of each type. At $\alpha = 0.05$, can it be concluded that the means of the weights are different?

Hard body types				Soft body types			
21	17	17	20	24	13	11	13
16	17	15	20	12	15		
23	16	17	17				
13	15	16	18				
18							

9. Find the 95% confidence interval for the difference of the means in Exercise 3 of this section.

$3.066 < \mu_1 - \mu_2 < 10.534$

10. Find the 95% confidence interval for the difference of the means in Exercise 8 of this section.

$-2.481 < \mu_1 - \mu_2 < 7.971$

11. Hours Spent Watching Television According to Nielsen Media Research, children (ages 2–11) spend an average of 21 hours 30 minutes watching television per week while teens (ages 12–17) spend an average of 20 hours 40 minutes. Based on the sample statistics obtained below, is there sufficient evidence to conclude a difference in average television watching times between the two groups? Use $\alpha = 0.01$.

	Children	Teens
Sample mean	22.45	18.50
Sample variance	16.4	18.2
Sample size	15	15

Source: *Time Almanac.*

12. NFL Salaries An agent claims that there is no difference between the pay of safeties and linebackers in the NFL. A survey of 15 safeties found an average salary of $501,580, and a survey of 15 linebackers found an average salary of $513,360. If the standard deviation in the first sample is $20,000 and the standard deviation in the second sample is $18,000, is the agent correct? Use $\alpha = 0.05$.

Source: NFL Players Assn./*USA TODAY.*

13. Cyber School Enrollment The data show the number of students attending cyber charter schools in Allegheny County and the number of students attending cyber schools in counties surrounding Allegheny County. At $\alpha = 0.01$ is there enough evidence to support the claim that the average number of students in school districts in Allegheny County who attend cyber schools is greater than those who attend cyber schools in school districts outside Allegheny County? Give a factor that should be considered in interpreting this answer.

Allegheny County						Outside Allegheny County					
25	75	38	41	27	32	57	25	38	14	10	29

Source: *Pittsburgh Tribune-Review.*