Chapter 10 selected exercise

10-1

課堂講解

1. The following results come from two independent random samples taken of two populations.

Sample 1	Sample 2
$n_1 = 50$	$n_2 = 35$
$\bar{x}_1 = 13.6$	$\bar{x}_2 = 11.6$
$\sigma_1 = 2.2$	$\sigma_2 = 3.0$

   a. What is the point estimate of the difference between the two population means?
   b. Provide a 90% confidence interval for the difference between the two population means.
   c. Provide a 95% confidence interval for the difference between the two population means.

課堂講解

3. Consider the following hypothesis test.

$$H_0: \mu_1 - \mu_2 = 0$$
$$H_a: \mu_1 - \mu_2 \neq 0$$

The following results are for two independent samples taken from the two populations.

Sample 1	Sample 2
$n_1 = 80$	$n_2 = 70$
$\bar{x}_1 = 104$	$\bar{x}_2 = 106$
$\sigma_1 = 8.4$	$\sigma_2 = 7.6$

   a. What is the value of the test statistic?
   b. What is the p-value?
   c. With $\alpha = .05$, what is your hypothesis testing conclusion?

Chapter 10 selected exercise

回家作業

8. **Increases in Customer Satisfaction.** Will improving customer service result in higher stock prices for the companies providing the better service? "When a company's satisfaction score has improved over the prior year's results and is above the national average (75.7), studies show its shares have a good chance of outperforming the broad stock market in the long run." The following satisfaction scores of three companies for the 4th quarters of two previous years were obtained from the American Customer Satisfaction Index. Assume that the scores are based on a poll of 60 customers from each company. Because the polling has been done for several years, the standard deviation can be assumed to equal 6 points in each case.

Company	Year 1	Year 2
Rite Aid	73	76
Expedia	75	77
J.C. Penney	77	78

a. For Rite Aid, is the increase in the satisfaction score from year 1 to year 2 statistically significant? Use $\alpha = .05$. What can you conclude?
b. Can you conclude that the year 2 score for Rite Aid is above the national average of 75.7? Use $\alpha = .05$.
c. For Expedia, is the increase from year 1 to year 2 statistically significant? Use $\alpha = .05$.
d. When conducting a hypothesis test with the values given for the standard deviation, sample size, and α, how large must the increase from year 1 to year 2 be for it to be statistically significant?
e. Use the result of part (d) to state whether the increase for J.C. Penney from year 1 to year 2 is statistically significant.

Chapter 10 selected exercise

10-2

課堂講解

11. Consider the following data for two independent random samples taken from two normal populations.

Sample 1	10	7	13	7	9	8
Sample 2	8	7	8	4	6	9

a. Compute the two sample means.
b. Compute the two sample standard deviations.
c. What is the point estimate of the difference between the two population means?
d. What is the 90% confidence interval estimate of the difference between the two population means?

課堂講解

10. Consider the following hypothesis test.

$$H_0: \mu_1 - \mu_2 = 0$$
$$H_a: \mu_1 - \mu_2 \neq 0$$

The following results are from independent samples taken from two populations.

Sample 1	Sample 2
$n_1 = 35$	$n_2 = 40$
$\bar{x}_1 = 13.6$	$\bar{x}_2 = 10.1$
$s_1 = 5.2$	$s_2 = 8.5$

a. What is the value of the test statistic?
b. What is the degrees of freedom for the t distribution?
c. What is the p-value?
d. At $\alpha = .05$, what is your conclusion?

Chapter 10 selected exercise

回家作業 (Data file)

15. **Hotel Prices.** Hotel room pricing changes over time (*Lodging Magazine*), but is there a difference between Europe hotel prices and U.S. hotel prices? The file *IntHotels* contains changes in the hotel prices for 47 major European cities and 53 major U.S. cities.
    a. On the basis of the sample results, can we conclude that the mean change in hotel rates in Europe and the United States are different? Develop appropriate null and alternative hypotheses.
    b. Use $\alpha = .01$. What is your conclusion?

10-3

課堂講解

20. The following data are from matched samples taken from two populations.

	Population	
Element	1	2
1	11	8
2	7	8
3	9	6
4	12	7
5	13	10
6	15	15
7	15	14

    a. Compute the difference value for each element.
    b. Compute $\bar{d}$.
    c. Compute the standard deviation s_d.
    d. What is the point estimate of the difference between the two population means?
    e. Provide a 95% confidence interval for the difference between the two population means.

Chapter 10 selected exercise

回家作業 (Data file)

25. **SAT Scores.** The College Board SAT college entrance exam consists of three parts: math, writing, and critical reading. Sample data showing the math and writing scores for a sample of 12 students who took the SAT follow.

Student	Math	Writing	Student	Math	Writing
1	540	474	7	480	430
2	432	380	8	499	459
3	528	463	9	610	615
4	574	612	10	572	541
5	448	420	11	390	335
6	502	526	12	593	613

a. Use a .05 level of significance and test for a difference between the population mean for the math scores and the population mean for the writing scores. What is the *p*-value and what is your conclusion?

b. What is the point estimate of the difference between the mean scores for the two tests? What are the estimates of the population mean scores for the two tests? Which test reports the higher mean score?

Chapter 10 selected exercise

10-4

課堂講解

28. Consider the following results for independent samples taken from two populations.

Sample 1	Sample 2
$n_1 = 400$	$n_2 = 300$
$\bar{p}_1 = .48$	$\bar{p}_2 = .36$

a. What is the point estimate of the difference between the two population proportions?
b. Develop a 90% confidence interval for the difference between the two population proportions.
c. Develop a 95% confidence interval for the difference between the two population proportions.

課堂講解

29. Consider the hypothesis test

$$H_0: p_1 - p_2 \leq 0$$
$$H_a: p_1 - p_2 > 0$$

The following results are for independent samples taken from the two populations.

Sample 1	Sample 2
$n_1 = 200$	$n_2 = 300$
$\bar{p}_1 = .22$	$\bar{p}_2 = .16$

a. What is the p-value?
b. With $\alpha = .05$, what is your hypothesis testing conclusion?

Chapter 10 selected exercise

回家作業

32. **Mislabeled Fish.** Researchers with Oceana, a group dedicated to preserving the ocean ecosystem, reported finding that 33% of fish sold in retail outlets, grocery stores, and sushi bars throughout the United States had been mislabeled (*San Francisco Chronicle*, https://www.sfgate.com/science/article/Mislabeled-fish-a-widespread-problem-4295946.php). Does this mislabeling differ for different species of fish? The following data show the number labeled incorrectly for samples of tuna and mahi mahi.

	Tuna	Mahi Mahi
Sample	220	160
Mislabeled	99	56

a. What is the point estimate of the proportion of tuna that is mislabeled?
b. What is the point estimate of the proportion of mahi mahi that is mislabeled?
c. Provide a 95% confidence interval estimate of the difference between the proportion of tuna and mahi mahi that is mislabeled.