10.5 Problem Set 4

Question 5, page 488, 14th Edition

Valentine's Day Expenditures. USA Today reports that the average expenditure on Valentine's Day is $100.89. Do male and female consumers differ in the amounts they spend? The average expenditure in a sample survey of 40 male consumers was $135.67, and the average expenditure in a sample survey of 30 female consumers was $68.64. Based on past surveys, the standard deviation for male consumers is assumed to be $35, and the standard deviation for female consumers is assumed to be $20.

(a) What is the point estimate of the difference between the population mean expenditure for males and the population mean expenditure for females?

(b) At 99% confidence, what is the margin of error?

(c) Develop a 99% confidence interval for the difference between the two population means

Question 13, page 495, 14th Edition

Annual Cost of College. The increasing annual cost (including tuition, room, board, books, and fees) to attend college has been widely discussed. The following random samples show the annual cost of attending private and public colleges. Data are in thousands of dollars.

Private Colleges					
52.8	43.2	45.0	33.3	44.0	
30.6	45.8	37.8	50.5	42.0	
Public Colleges					
20.3	22.0	28.2	15.6	24.1	28.5
22.8	25.8	18.5	25.6	14.4	21.8

(a) Compute the sample mean and sample standard deviation for private and public colleges.

(b) What is the point estimate of the difference between the two population means? Interpret this value in terms of the annual cost of attending private and public colleges.

(c) Develop a 95% confidence interval of the difference between the mean annual cost of attending private and public colleges.

Question 15, page 496, 14th Edition

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 $\alpha = 0.01$. What is your conclusion?

Question 21, page 500, 14th Edition

Television Commercials and Product Purchase Potential. A market research firm used a sample of individuals to rate the purchase potential of a particular product before and after the individuals saw a new television commercial about the product. The purchase potential ratings were based on a 0 to 10 scale, with higher values indicating a higher purchase potential. The null hypothesis stated that the mean rating "after" would be less than or equal to the mean rating "before." Rejection of this hypothesis would show that the commercial improved the mean purchase potential rating. Use $\alpha = .05$ and the following data to test the hypothesis and comment on the value of the commercial.

	Purchase Rating			Purchase Rating	
Individual	After	Before	Individual	After	Before
1	6	5	5	3	5
2	6	4	6	9	8
3	7	7	7	7	5
4	4	3	8	6	6

Question 25, page 502, 14th Edition

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?

Question 33, page 507, 14th Edition

Voter Turnout. Minnesota had the highest turnout rate of any state for the 2016 presidential election (United States Election Project website). Political analysts wonder if turnout in rural Minnesota was higher than turnout in the urban areas of the state. A sample shows that 663 of 884 registered voters from rural Minnesota voted in the 2016 presidential election, while 414 out of 575 registered voters from urban Minnesota voted.

(a) Formulate the null and alternative hypotheses that can be used to test whether registered voters in rural Minnesota were more likely than registered voters in urban Minnesota to vote in the 2016 presidential election.

(b) What is the proportion of sampled registered voters in rural Minnesota that voted in the 2016 presidential election?

(c) What is the proportion of sampled registered voters in urban Minnesota that voted in the 2016 presidential election?

(d) At $\alpha = 0.05$, test the political analysts' hypothesis. What is the p-value, and what conclusion do you draw from your results?