Practice Problems for Exam2  
Paraphrased problems from EMBS.

**30. (p 484)** A large auto insurance company selected random samples of single and married male policy-holders and recorded the number who made a claim over the preceding three-year period.

|  |  |
| --- | --- |
| Single Male Policy-Holders | Married Male Policy-Holders |
| n=400 | n=900 |
| Number making claims = 76 | Number making claims = 90 |

Is the observed difference in claim rates statistically significant?

**40. (p 486)** *The Wall Street Journal* Subscriber Study gathered data on the employment status of a random sample of subscribers. Sample results were broken out for subscribers of the eastern and western editions.

|  |  |  |
| --- | --- | --- |
|  | Region | |
| EMPLOYMENT STATUS | Eastern Edition | Western Edition |
| Full-Time | 1105 | 574 |
| Part-Time | 31 | 15 |
| Self Employed | 229 | 186 |
| Not employed | 485 | 344 |

Test the hypothesis that employment status is independent of region.

**PEP Problem NOT in the Book.**  THE MARK and UPTOWN KITCHEN are separate restaurants owned by the same firm. The weekend revenue generated by THE MARK is normally distributed with mean $80,000 and standard deviation $10,000. The UPTOWN KITCHEN revenues are normally distributed with mean $100,000 and standard deviation of $20,000. The following questions refer to the total weekend revenue enjoyed by the firm.

a. What is the mean?  
b. What is the standard deviation?  
c. What is the shape of the distribution?  
e. Which of your answers to a,b,c requires revenues from the two restaurants to be independent?  
f. Which of your answers to a,b,c requires that revenues at each store are normal?  
  
g. (Difficult?) Next weekend, which restaurant will bring in more revenue?

**46 (p 341)** AARP estimated that the average annual expenditure on restaurants and carryout food was $1,873 for people 50 and over. Suppose this estimate is based on a random sample of 80 people and that the sample standard deviation is $550.  
  
b. What is the 95% confidence interval for the population mean amount spent on restaurants and carryout.

d. If the distribution of amounts is positively skewed (not normal), would you expect the sample median amount to be greater or less than $1,873?

e. (not in the book). If the distribution of amounts is positively skewed (not normal), does this make your answer to b.) invalid? Briefly explain.

**52 (p 390)**. The chamber of commerce of a Florida Gulf Coast community advertises that residential property is available at a mean cost of $125,000 or less per acre. A random sample of 32 properties has a sample mean cost per acre of $130,000 and sample standard deviation of $12,500. Comment on the validity of the advertising statement.

**56 (p 391).** Virtual call centers are staffed by individuals working from home. Regional Airways is considering switching from its traditional call center to a virtual one but only if a level of customer satisfaction greater than 80% can be maintained. In a test of home agents, 252 out of 300 randomly chosen customers reported being satisfied with their experience with the call center.

a. Formulate a relevant null and alternative hypothesis.  
b. What is the sample proportion of satisfied customers?  
c. What is the p-value of your test of hypothesis?  
d. What is your conclusion?

**42 (p 446).** Mutual funds are either load or no-load. Because load mutual funds charge fees not charged by no load funds, the question is whether load funds provide a higher mean return. Returns from a random sample of 30 load and 30 no load mutual funds are provided in an accompanying Excel spreadsheet.

a. Formulate a null and alternative hypothesis such that rejection of the null leads to the conclusion that load funds have higher mean returns.

b. Use the data to test your hypothesis. What is the p-value and your conclusion?

**44 (p 446).** Typical prices of single-family homes in Florida are shown for a random sample of 15 metropolitan areas (Naples Daily News, February 23, 2003). Data are in thousands of dollars and are in the spreadsheet.

|  |  |  |
| --- | --- | --- |
| **Metro Area** | **Jan-03** | **Jan-02** |
| Daytona Beach | 117 | 96 |
| Fort Lauderdale | 207 | 169 |
| Fort Myers | 143 | 129 |
| Fort Walton Beach | 139 | 134 |
| Gainesville | 131 | 119 |
| Jacksonville | 128 | 119 |
| Lakeland | 91 | 85 |
| Miami | 193 | 165 |
| Naples | 263 | 233 |
| Ocala | 86 | 90 |
| Orlando | 134 | 121 |
| Pensacola | 111 | 105 |
| Sarasota-Bradenton | 168 | 141 |
| Tallahassee | 140 | 130 |
| Tampa-St. Petersburg | 139 | 129 |

Have mean prices changed across the two years? Formulate and test an appropriate hypothesis.

**46 (p 448).** A study claimed that self-employed individuals do not experience greater job satisfaction than individuals who are not self-employed. Job satisfaction was measured using 18 questions with answers ranging from 1 to 5. The total score was the measure of job satisfaction. Scores for individuals in four separate professions are given below and in the spreadsheet.

|  |  |  |  |
| --- | --- | --- | --- |
| Lawyer | Physical Therapist | Cabinetmaker | Systems Analyst |
| 44 | 55 | 54 | 44 |
| 42 | 78 | 65 | 73 |
| 74 | 80 | 79 | 71 |
| 42 | 86 | 69 | 60 |
| 53 | 60 | 79 | 64 |
| 50 | 59 | 64 | 66 |
| 45 | 62 | 59 | 41 |
| 48 | 52 | 78 | 55 |
| 64 | 55 | 84 | 76 |
| 38 | 50 | 60 | 62 |

Are the differences in sample mean job satisfaction scores across the four professions statistically significant?