11-2

8. Flat Tire and Missed Class A classic tale involves four carpooling students who missed test and gave as an excuse a flat tire. On the makeup test, the instructor asked the students to identify the particular tire that went flat. If they really didn’t have a flat tire, would they be able to identify the same tire? The author asked 41 other students to identify the tire they would select. The results are listed in the following table (expect for one student who selected the spare). Use a 0.05 significance level to test the author’s claim that the results fit a uniform distribution. What does the result suggest about the ability of the four students to select the same tire when they really didn’t have a flat?

Tire   :     Left front          Right front         Left rear            Right rear

Number selected:   11                     15                    8                         6

18.

Do World War 11 Bomb Hits a Poisson Distribution? In a analyzing hits by V-1 buzz bombs in World War 11, South London was subdivided into regions, each with an area of 0.25 km2. Shown below is a table of actual frequencies of hits and the frequencies expected with the Poisson distribution. (The Poisson distribution is described in Section 5-5) Use the valves listed and 0.05 significance level to test the claim that the actual frequencies fit a Poisson distribution.

|  |  |  |  |
| --- | --- | --- | --- |
| Number of bombs hits | 0 1 | 2 3 | 4 or more |
| Actual number of regions | 229 211 | 93 35 | 8 |
| Expected number of regions (from Poisson distribution) | 227.5 211.4 | 97.9 30.5 | 8.7 |

11-3

18. Global Warming Survey - A pew research poll was conducted to investigate opinions about global warming. The respondents who answered yes when asked if there is solid evidence that the earth is getting warmer were then asked to select a cause of global warming. The results for two age brackets are given in the table below. Use a 0.01 significance level to test the claim that the age bracket is independent of the choice for the cause of global warming.

Do respondents from both age brackets appear to agree, or is there a substantial difference?

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Human activity** | Natural patterns | Don't know or refused to answer |
| Under 30 | 108 | 41 | 7 |
| 65 and over | 121 | 71 | 43 |

12-2

14. Car Emissions Listed below are measured amounts of greenhouse gas emissions from cars in three different categories (from Data Set 16 in Appendix B). The measurements are in tons per year, expressed as CO2 equivalents. Use a 0.05 significance level to test the claim that the different car categories have the same mean amount of greenhouse gas emissions. Based on the results, does the number of cylinders appear to affect the amount of greenhouse gas emissions?

Four cylinder 7.2 7.9 6.8 7.4 6.5 6.6 6.7 6.5 6.5 7.1 6.7 5.5 7.3

Six cylinder 8.7 7.7 7.7 8.7 8.2 9.0 9.3 7.4 7.0 7.2 7.2 8.5

Eight cylinder 9.3 9.3 8.6 8.6 8.7 9.3 9.3

9-5

12. Home Size and Selling Price Using the sample data from Data Set 23 in Appendix B, 21 homes with living areas under 2000 ft2have selling prices with a standard deviation of $32,159.73. There are 19 homes with living areas greater than 2000 ft2 and they have selling prices with a standard deviation of $66,628.50. Use a 0.05 significance level to test the claim of a real estate agent that homes larger than 2000 ft2 have selling prices that vary more that vary more than the smaller homes.

10-2

16. Heights of Presidents and Runners-Up Theories have been developed about the heights of winning candidates for the U.S presidency and the heights of candidates who were runners-up. Listed below are heights (in inches) from recent presidential elections. Is there a linear correlation between the heights of candidates who won and the heights of the candidates who were runners-up?

Winner: 69.5, 73, 73, 74, 74.5, 74.5, 71, 71  
Runner up: 72, 69.5, 70, 68, 74, 74, 73, 76

10- 3

16. Heights of Presidents and Runners-Up Find the best predicted height of runner-up Goldwater, given that the height of the winning presidential candidate Johnson is 75 in. Is the predicted height of Goldwater close to his actual height of 72 in.?  
Winner 69.5 73 73 74 74.5 74.5 71 71  
Runner-Up 72 69.5 70 68 74 74 73 76