**1**. High levels of cockpit noise in an aircraft can damage the hearing of pilots who are exposed to this hazard for many hours. A Boeing 727 co-pilot collected 61 noise observations using a handheld sound meter. Noise level is defined as “Low” (under 88 decibels), “Medium” (88 to 91 decibels), or “High” (92 decibels or more). There are three flight phases (Climb, Cruise, Descent). Research question: At α = .05, is the cockpit noise level independent of flight phase?

**Be sure to test whether the Chi-Square table has too many cells with expected value less than 5. If it does, then combine the Cruise and Descent columns and try again.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Observed frequencies | |  |  |  |
| **Noise Level** | **Climb** | **Cruise** | **Descent** | **Row Total** |
| **Low** | 6 | 2 | 6 | **14** |
| **Medium** | 18 | 3 | 8 | **29** |
| **High** | 1 | 3 | 14 | **18** |
| **Col Total** | **25** | **8** | **28** | **61** |

Step 1: State the null and alternate hypotheses

Step 2: Select a level of significance

|  |  |
| --- | --- |
| α = | 0.05 |

Step 3: Identify the test statistic and state its formula



Step 4: Formulate a decision rule

Step 5: Make a decision

============================================================================================

**2**. In 1995, with the introduction of the color blue in M&M candy bags, a researcher purchased several bags and counted the number of each color present. The results are given in the table below. Perform a goodness of fit test to determine, at the 0.1 significance level, what can be said about whether the colors were equally distributed in the overall population of M&M candies.

|  |  |  |
| --- | --- | --- |
| Observed frequencies | | |
| **Red** | 73 |  |
| **Green** | 41 |  |
| **Blue** | 69 |  |
| **Brown** | 78 |  |
| **Yellow** | 62 |  |
| **Orange** | 58 |  |
| **Sum =** | **381** |  |

Step 1: State the null and alternate hypotheses

Step 2: Select a level of significance

|  |  |
| --- | --- |
| α = | 0.1 |

Step 3: Identify the test statistic and state its formula



Step: 4 Formulate a decision rule

Step 5: Make a decision