1. Following the nuclear mishap at Three Mile Island near Harrisburg PA, a sample of 150 households were surveyed. One question asked was “Should there have been a full evacuation of the immediate area?” The following table classifies the responses according to the distance from the accident. Test whether the distance from the accident and evacuation attitudes are associated.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Full  Evacuation | Distance (in miles) from Three Mile Island | | | | | |
| 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 15+ |
| Yes | 7 | 11 | 10 | 5 | 4 | 29 |
| No | 9 | 11 | 13 | 6 | 6 | 39 |

Answer:

A chi-square test with the null hypothesis that Evacuation attitudes and Distance are independent of each other on the given table gives a p value of .9939 so we cannot reject the null hypothesis that the two are independent meaning not associated.

Since one of the cell count is less than 5 if we modify the table like this

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Full  Evacuation | Distance (in miles) from Three Mile Island | | | | |
| 1-3 | 4-6 | 7-9 | 10-15 | 15+ |
| Yes | 7 | 11 | 10 | 9 | 29 |
| No | 9 | 11 | 13 | 12 | 39 |

Now a chi square test on this table with the null hypothesis that Evacuation attitudes and Distance are independent of each other on the given table gives a p value of 0.9836 so we can’t reject the null hypothesis.

So the two are not associated.

1. The number of first births to 700 women in the University Hospital of Basel, Switzerland by month are shown in the table below. Test whether the births are spread uniformly through the year.

|  |  |
| --- | --- |
| Month | No. of Births |
| January | 66 |
| February | 63 |
| March | 64 |
| April | 48 |
| May | 64 |
| June | 74 |
| July | 70 |
| August | 59 |
| September | 54 |
| October | 51 |
| November | 45 |
| December | 42 |

Answer:

A Chi-square test with the null hypothesis that the probability of birth are uniform across each month(probability = 1/12) gives a p value of 0.04925 so we can reject the null hypothesis that the births are uniformly spread throughout the year.