GSBA 545 for MSBA, Homework 4

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1. Answers:
   1. To prove the sex proportion is independent of coke types, we apply chi-square independent test. The test statistic is .
   2. By calculation, with degree of freedom of , the p-value is 0.881556, far from 0.1 significance. We tend to believe that there’s no difference of sex proportion between Pepsi and Coke.

|  |  |  |  |
| --- | --- | --- | --- |
| Expected Value | Male | Female | Sum |
| Coke | 71.5 | 38.5 | 110 |
| Pepsi | 58.5 | 31.5 | 90 |
| Sum | 130 | 70 | 200 |

1. By calculation, with degree of freedom of , the p-value is 0.0872. Under 0.1 significance, it is enough to reject the hypothesis of independence and believe that party affiliation has some relationship with education levels.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Expected value | Democrat | Republic | Independent | Sum |
| Under High School | 113.1 | 78.3 | 98.6 | 290 |
| High School | 126.75 | 87.75 | 110.5 | 325 |
| College | 150.15 | 103.95 | 130.9 | 385 |
| Sum | 390 | 270 | 340 | 1000 |

1. Answers:
   1. The null hypothesis is that the probability follows 1/6 for each die number(). The alternative hypothesis is that at least one probability of one die number differs from 1/6().
   2. The p-value is approximately .

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 |
| Expected Value | 166.6667 | 166.6667 | 166.6667 | 166.6667 | 166.6667 | 166.6667 |

* 1. The p-value is far less from 0.1 significance, so we reject the hypothesis and believe the probability is not 1/6 for each number. The die is replaced.

1. Answers:
   1. The null hypothesis is that the percentage of different manufactured cars in 1990 is still the same today(). The alternative hypothesis s that today’s car brand percentage is different from that of 1990.
   2. The p-value is 0.026. At 0.05 significance, we reject the null hypothesis and believe today’s car brand percentage is different from that of 1990. At 0.01 significance, we cannot reject the null hypothesis and tend to accept that today’s car brand percentage is still the same as that of 1990.
2. Answers:
   1. the expected number of females participating in the health plan should be 393.75
   2. The table is as follow:

|  |  |  |
| --- | --- | --- |
|  | Participate | Not Participate |
| Male | 488.25 | 131.75 |
| Female | 393.75 | 106.25 |

* 1. The p-value is approximately 0.0005, far less that 0.05 significance, thus we believe that gender has some relationship with health plan participation.

1. The p-value is 0.147, which is minimum of significance when chi-square statistic is in rejection zone. The significance should be 0.147 or larger.