**Type: E**

**Title: Rec Vehicles Homogeneity 1**

1. A manufacturing plant for recreational vehicles receives shipments from three different parts vendors. There has been a defect issue with some of the electrical wiring in the recreational vehicles manufactured at the plant. The plant manager wonders if all of the vendors might be contributing equally to the defect issue. The plant manager reviews a sample of quality assurance inspections from the last six months. The data are shown in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  | K&N | Cycra | torc1 |
| Rejected | 53 | 48 | 70 |
| Perfect | 93 | 71 | 88 |
| Not Perfect but acceptable | 22 | 31 | 22 |

Test an appropriate hypothesis to decide if the plant manager is correct. Give statistical evidence to support your conclusion.

1) We want to know whether if all of the vendors might be contributing equally to the defect issue.

: The type of defects in vehicles made by the three vendors has the same distribution (are homogeneous).

: The type of defects in vehicles made by the three vendors does not have the same distribution (are not homogeneous).

Conditions:

\* Counted data: We have the counts from a sample of quality assurance inspections from the last six months.

\* Randomization: The data are from a sample of quality assurance inspections from the last six months.

\* Expected cell frequency: The expected values (shown in parenthesis in the table) are all greater than five.

Under these conditions, the sampling distribution of the test statistic is with (3 - 1)(3 - 1) = 4 degrees of freedom.

We will perform a chi-square test of homogeneity.

 = = + + ... = 7.40

P = P( > 7.40) = 0.1161

The P-value of 0.1161 is rather high, so we fail to reject the null hypothesis. There is little statistical evidence to indicate that the types of defects vary by vendor.