

UNIVERSITY OF RUHUNA
DEPARTMENT OF MATHEMATICS

BACHELOR OF SCIENCE (SPECIAL) DEGREE (LEVEL II)
MATHEMATICS
MST 4053: STATISTICS LABORATORY

Assignment No: 08

Semester I, 2010

30/03/2010

1. A local grocery store stocks four brands of cola. Suppose that, nationally, brand A commands 40% of the market, brand B has 35%, brand C has 20%, and brand D has 5%. Of 2000 colas sold during 1 week in the store, 615 were brand B, 383 were brand C, and 198 were brand D. Do the data collected at the local grocery store fit the national percentages?
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2. A large jar has red, black, blue, and white marbles in it. One hundred marbles are drawn from the jar with these results.

Color	red	black	blue	white
Frequency	28	19	22	31

Is there statistical evidence that the proportions of marbles of the four colors are the same? Prior to conducting the test, verify that the assumptions for the goodness-of-fit test are met.

3. A survey was conducted in a voting district to record (among several other variables) the political party and gender of the respondents. The political party and gender were coded as follows and in the data set *Politic*.

Party	Gender
1-democrat,2-republican,3-other	1-female,2-male

Organize the data in a contingency table according to the variables *political party* and *gender*. Perform a chi-square test of independence on the two variables

4. A study of the absenteeism of bus drivers in the transit system for the city of Edmonton, Alberta, produced data in the data set *Bus*. Based on the data, is the attendance of bus drivers dependent on the shift? Be sure to state the null and alternative hypotheses. Give the p -value of the test statistic and state your conclusion.

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5. Prior to the enactment of seat belt legislation in the province of Alberta, Canada, data were collected on 86,769 automobile accident reports to determine the effectiveness of seat belts in preventing injury. The data set *Seatbelt* gives the injury level of the driver and whether he or she was wearing a seatbelt. Is there statistical evidence that seat belts help prevent injury? Be sure to formulate null and alternative hypotheses, give the p -value, and state your conclusion.
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6. Are foreign cars safer than domestic cars? The Insurance Institute for Highway Safety (IIHS) and the Highway Loss Data Institute (HLDI) collect vehicle loss data from major insurers and the federal government to produce fatality ratings for most makes of automobiles. The fatality ratings are based on actual occupant deaths per registered vehicle. These data are based on foreign and domestic vehicles (pickup trucks included) for the 1988-92 model years. Use data set *Vehicle*. Based on these data, are the fatality ratings similar for foreign and domestic vehicles?

- a) Identify the variable of classification.
 - b) Identify the populations.
 - c) Formulate your hypotheses.
 - d) Calculate the test statistic and its p -value and state your conclusion.
 - e) Are any assumptions for the chi-square test in question?
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7. The average cost of a funeral ranges from around \$2000 in the West to as much as \$3000 to \$4000 in the central states. One hundred people in each region who had buried a loved one were surveyed and asked to complete a questionnaire regarding the cost of the funeral. From the contingency table, determine whether the perceived cost of a funeral is the same across the regions of the country. Use data set *Funeral*.
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8. In a local referendum to legalize the sale of beer, voters were surveyed about their opinions on the referendum and their views on the moral issue of selling alcoholic beverages. From the contingency table, determine whether their moral values are related to their opinions on the referendum. Use data set *Drink*.
