1. You want to see the relationship between a student's HSC math score and whether or not the student gets admission to 'Ka' Unit of DU. The model: $\log(o(x)) = a + bx$ has been fitted to a sample of 80 students. The coefficients are: $\hat{a} = -9.79$ and $\hat{b} = 0.157$. Explain the result.

2. A data set of size $n = 15$ contains measurements of yield from an experiment done at different temperature levels. The variables are yield and temperature in degrees Fahrenheit. A quadratic polynomial is fitted to obtain the following coefficients: 7.96, -0.1537 and 0.0011, respectively. Write the regression model and the fitted equation. Interpret the results if the p-values are 0.000, 0.002 and 0.001, respectively.

3. · In a test of the ability of a certain polymer to remove toxic wastes from water, experiments were conducted at three different temperatures. The data below give the percentages of the impurities that were removed by the polymer in 21 independent attempts.

Low Temp	Med Temp	High Temp
42	36	33
41	35	44
37	32	40
29	38	36
35	39	44
40	42	37
32	34	45

Test the hypothesis that the polymer performs equally well at all three temperatures.

4. A study has been made on pyrethrum flowers to determine the content of pyrethrin, a chemical used in insecticides. Four methods of extracting the chemical are used, and samples are obtained from flowers stored under three conditions: fresh flowers, flowers stored for 1 year, and flowers stored for 1 year but treated. The data are as follows:

Pyrethrin Content, Percent

Storage Condition	A	B	C	D
1	1.35	1.13	1.06	0.98
2	1.40	1.23	1.26	1.22
3	1.49	1.46	1.40	1.35

two-factor analysis of variance

Suggest a model for the preceding information, and test the relevant hypotheses.

5. According to the Mendelian theory of genetics, a certain garden pea plant should produce either white, pink, or red flowers, with respective probabilities ¼, ½ and ¼. To test this theory, a sample of 564 peas was studied with the result that 141 produced white, 291 produced pink, and 132 produced red flowers. Using the chi-square approximation, what conclusion would be drawn at the 5 percent level of significance?

6. An experiment designed to study the relationship between hypertension and cigarette smoking yielded the following data.

	Nonsmoker	Moderate Smoker	Heavy Smoker
Hypertension	20	38	28
No hypertension	50	27	18

Test the hypothesis that whether or not an individual has hypertension is independent of how much that person smokes.

7. A new medicine against hypertension was tested on 18 patients. After 40 days of treatment, the following changes of the diastolic blood pressure were observed.

$-5, -1, \ +2, +8, -25, +1, \ +5, -12, -16$
$-9, -8, -18, -5, -22, +4, -21, -15, -11$

Use the sign test to determine if the medicine has an effect on blood pressure.

8. Use the signed rank test in the above problem to determine if the medicine has an effect on blood pressure.

9. Fifteen cities, of roughly equal size, are chosen for a traffic safety study. Eight of them are randomly chosen, and in these cities a series of newspaper articles dealing with traffic safety is run over a 1-month period. The number of traffic accidents reported in the month following this campaign is as follows.

Treatment group: 19, 31, 39, 45, 47, 66, 74, 81.
Control group: 28, 36, 44, 49, 52, 52, 60

Test the hypothesis that the articles have not had any effect.

10. The following data represent the successive quality levels of 25 articles: 100, 110, 122, 132, 99, 96, 88, 75, 45, 211, 154, 143, 161, 142, 99, 111, 105, 133, 142, 150, 153, 121, 126, 117, 155. Does it appear that these data are a random sample from some population?