UNIVERSITY OF RUHUNA
DEPARTMENT OF MATHEMATICS

BACHELOR OF SCIENCE (GENERAL) DEGREE (LEVEL II)
APPLIED MATHEMATICS
IMT 224β/AMT 224β:APPLIED STATISTICS

Minitab Assignment

1. Below table represents the service structure of a particular institute.

Service	**Number**
Gentrification	12
Immigrant Services	16
Local Services	61
Professional Services	10
Services of Poverty	3
Training Centres	0
Workshops	3

(a) Summarize above data using a pie chart.

(b) Summarize above data using a bar chart.

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2. Suppose we have recorded the numbers of boys and girls who come to the class from Monady to Friday on a particular week.

Day	**Girls**	**Boys**
Monday	19	18
Tuesday	20	20
wednesday	24	20
Thusday	19	20
Friday	14	16

(a) Represent the data graphically using a grouped bar chart.

(b) Represent the data graphically using a stack bar chart.

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3. Draw the stem and leaf plot for following data.

24, 10, 13, 2, 28, 34, 65, 67, 55, 34, 25, 59, 8, 39, 61.

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4. The average amount of rainfall in inches for each of 70 U.S. and Puerto Rico cities are given below.

7 7.2 7.8 7.8 11.5 13 14 14.6 15 15.2 16.2 17.2 17.4 20.7 22.9 24.7 25.9 29.1 30.2 30.2 30.6 30.8 31 31.4 31.7 32.5 33.4 34.4 35 35.1 35.9 35.9 36.1 36.2 36.2 37 37 37.6 38.7 38.8 38.9 39 39.9 40.2 40.2 40.8 40.8 41.8 42.5 42.5 42.6 42.7 42.8 43.1 43.4 44.7 45.5 46 46.4 48.2 48.3 48.5 49.1 49.2 54.5 54.7 56.8 59.2 59.8 67

(a) Draw histrogram for above data.

(b) Draw box plot for above data.

(c) Obtain discriptive statistics for above data.

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5. A study of the association between reading ability and IQ scores was conducted by a reading coordinator in a lager public school system. A random sample of 14 eighth-grade students was given a reading achievement test and an IQ test. The score are recorded in the table:

Reading Score	42	35	61	28	48	46	59	21	47	29	65	37	35	53
IQ score	105	110	122	92	112	100	120	85	125	96	130	90	107	120

(a) Organize these data in a scatter plot.

(b) What is meant by bivariate outliers and are there any bivariate outliers in the data?

(c) Dose it appear that a straight line would fit the data reasonably well?

(d) On your scatter plot, sketch in a straight line that fits the data.

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6. To study how bone density changes as children grow, researchers at Citrus Hill Plus Calcium compiled data for five prominent research journals. They found these percents of peak bone density for different-aged children.

Age	2	4	6	8	10	12	14	16	18
Percent	43	49	51	56	63	71	82	91	95

(a) What are the least squares estimates of β_0 and β_1 for the model $y = \beta_0 + \beta_1 x + \epsilon$?

(b) Graph the regression equation on the scatter plot. Does it fit the data?

(c) What is the standard error about regression line?

(d) Is it reasonable to extrapolate the percent of peak bone density to age 20?

(e) Plot the residuals against the predicted values and comment on the model.

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7. These data are IQ and GPA scores for a random sample of 12 students.

IQ(x)	115	132	125	120	119	132	105	114	106	139	127	118
GPA(y)	2.2	3.3	3.0	2.6	2.9	3.5	2.2	2.7	3.7	1.8	3.7	2.4

(a) Examine the scatter plot for any unusual behavior. Are there any bivariate outliers? Will they have an adverse effect on the least square regression line?

(b) Find the least squares estimates of β_0 and β_1 in the model $y = \beta_0 + \beta_1 x + \epsilon$.

(c) What is the value of the R^2? What does it tell you about the proposed model?

(d) Should we use this model to predict GPA from one's IQ?

(e) Complete a residual analysis of the model.

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8. Suppose 68% of all requests for financial aid are approved by a university. Determine the probabilities associated with the number of approvals being 7 out of 20 requests.

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9. The average number of homes sold by the Acme Realty company is 2 homes per day. What is the probability that exactly 3 homes will be sold tomorrow?

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10. An average light bulb manufactured by the Acme Corporation lasts 300 days with a standard deviation of 50 days. Assuming that bulb life is normally distributed, what is the probability that an Acme light bulb will last at most 365 days?

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11. (a) Marks of a IQ exam may be normally distributed with mean 100 and standard deviation 16.

(i) Generate marks of a particular student.

(ii) Generate marks of 100 students.

(b) Consider Bernoulli distribution with p=0.5.

(i) Generate single Bernoulli trail.

(ii) Generate 10 Bernoulli trails.

(c) Consider Binomial distribution with n=10 and p=0.5.

(i) Generate single trail.

(ii) Generate 10 trails.

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