

**ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD**  
*(Department of Mathematics & Statistics)*

**WARNING**

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Course: Business Statistics (1430)  
Level: B.A/B.Com/BBA

Semester: Autumn, 2012  
Total Marks: 100  
Pass Marks: 40

**ASSIGNMENT No. 1**

*Note: Attempt all questions.*

- Q. 1 (a) The National Association of Real Estate sellers collected the following data on a sample of 130 sales people representing their total commission earnings annually

<b>Earnings</b>	<b>Frequency</b>
\$ 5,000 or less	5
\$ 5,001 - \$ 10,000	9
\$ 10,001 - \$ 15,000	11
\$ 15,001 - \$ 20,000	33
\$ 20,001 - \$ 30,000	37
\$ 30,001 - \$ 40,000	19
\$ 40,001 - \$ 50,000	9
Over \$ 50,000	7

Construct an ogive that will help you to answer the following questions:

- i) About what proportion of the sales people earns more than \$ 25,000?
- ii) About what does the “middle” salesperson in the sample earn?
- iii) Approximately how much could a real estate salesperson whose performance was about 25 percent from the top expect to earn annually?
- iv) Construct an histogram and check the normality of the data

- (b) Define the following terms.
- (i) Data Point and Data Set
  - (ii) Frequency Distribution and Frequency Curve
  - (iii) Frequency Polygon
  - (iv) Histogram
  - (v) Representative Sample

Q. 2 The president of a Pakistani Airline is trying to estimate when the Federal Aviation Administration (FAA) is most likely to rule on the company's applications for a new route between two Stations A & B. Assistants to the president have assembled the following waiting times for applications field during the past year. The data given below are in days from the date of application

34	40	23	28	31	40	25	33	47	32
44	34	38	31	33	42	26	35	27	31
29	40	31	30	34	31	38	35	37	33
24	44	37	39	32	36	34	36	41	39
29	22	28	44	51	31	44	28	47	31

- a) Construct a frequency distribution using 10 closed intervals, equally spaced. Which interval contains the most data point?
- b) Construct a frequency distribution using 5 closed intervals, equally spaced. Which interval contains the most data points?

Q. 3 Fund info provides information to its subscribers to enable them to evaluate the performance of mutual funds; they are considering as potential investment vehicles. A recent survey of funds whose stated investment goal was growth and income produced the following data on total annual rate of return over the past five years:

Annual Return (%)	Frequency
11.0-11.9	2
12.0-12.9	2
13.0-13.9	8
14.0-14.9	10
15.0-15.9	11
16.0-16.9	8
17.0-17.9	3
18.0-18.9	1

- (a) Calculate the mean, and standard deviation of the annual rate of return for this sample of 45 funds.
- (b) Because the distribution is roughly bell-shaped, between what values would you expect to find 68 percent of the observations? What percentage of the observations actually does fall in that interval?

Q. 4 Mr. Leghari does statistical analysis for an automobile racing team. Here are the 20 fuel consumption figures in miles per gallon for the team's cars in recent races:

4.77	6.11	6.11	5.05	5.99	4.91	5.27	6.01	5.41	6.10
5.75	4.89	6.05	5.22	6.02	5.24	6.11	5.02	4.95	5.81

- (a) Calculate the mean and median of fuel consumption.
- (b) Group the data into five equally sized classes. What is the fuel consumption value of the modal class?
- (c) Which of the three measures of central tendency is best for Mr. Leghari to use when she orders fuel? Explain.

Q. 5 The fish and game station of Lake Wylie keeps records of fish caught on the lake and reports its finding to the National Fish and Game Service. The catch in pounds for the last 20 days was:

101	132	145	144	130	88	156	188	169	130
90	140	130	139	99	100	208	192	165	216

Calculate at least four measures of dispersion for these data. In this instance, is the range a good measure of the variability? Why?

## ASSIGNMENT No. 2

**Total Marks: 100**

**Pass Marks: 40**

- Q. 1 a) Microsoft estimated last year that 35 percent of potential software buyers were planning to wait to purchase the new operating system, Window Panes, until an upgrade had been released. After an advertising campaign

to reassure the public, Microsoft surveyed 3,000 people and found 950 who were still skeptical. Using  $\alpha = 0.05$ , can the company conclude the proportion of skeptical people has decreased?

- b) A national shopping survey was conducted to study the average weekly buying habits of a typical family in 1992 and 1996. The data collected are as follows:

Items	1992		1996	
	Unit Price	Quantity	Unit Price	Quantity
<b>Cheese (8 oz)</b>	\$ 1.19	2	\$ 2.09	1
<b>Bread (1 loaf)</b>	0.79	3	1.09	3
<b>Eggs (1 Doz)</b>	0.84	2	1.35	1
<b>Milk (1 gal)</b>	1.36	2	2.39	2

Calculate Laspere and Paasche index for 1996 using 1992 as the base period.

- Q. 2 (a) The average weekly hot chocolate sales two years ago was 984.7 pounds and the standard deviation was 72.6 pounds. Maxwell's has randomly selected 30 weeks from the past year and found average sales of 912.1 pounds.
- (i) State appropriate hypotheses for testing whether hot chocolate sales have decreased and at 2 percent significance level, test these hypotheses.
- (b) The average commission charged by full-service brokerage firms on a sale of common stock is \$52. Mr. Bashir has taken a random sample of 121 trades by his clients and determined that they paid an average commission of \$151. Using  $\alpha = 0.10$ , can Mr. Bashir conclude that his clients' commissions are higher than the industry average?
- Q. 3 (a) A television documentary on overeating claimed that Lahorians are about 10 pounds overweight on average. To test this claim, eighteen randomly selected individuals were examined; their average excess weight was found to be 12.4 pounds, and the sample standard deviation was 2.7 pounds. Using

$\alpha = 0.01$ , is there any reason to doubt the validity of the claimed 10-pound value?

- (b) For a sample of 60 women taken from a population of over 5,000 enrolled in a weight-reducing program at a nationwide chain of health spas, the sample mean diastolic blood pressure is 101 and the sample standard deviation is 42. Using  $\alpha = 0.02$ , on average, did the women enrolled in the program have diastolic pressure that exceeds the value of 75?

Q. 4 (a) A sample of 30-year conventional mortgage rates at 11 randomly chosen banks in Islamabad yielded a mean rate of 7.61 percent and a standard deviation of 39 percent. A similar sample taken at 8 randomly chosen banks of 0.56 percent. Do these samples provide evidence to conclude (at  $\alpha = 0.10$ ) that conventional mortgage rates in Islamabad and Karachi come from populations with different means?

- (b) A credit-insurance organization has developed a new high-tech method of training new sales personnel. The company sampled 16 employees who were trained the original way and found average daily sales to be \$688 and the sample standard deviation was \$32.63. They also sampled 11 employees who were trained using the new method and found average daily sales to be \$706 and the sample standard deviation was \$24.84. At  $\alpha = 0.05$ , can the company conclude that average daily sales have increased under the new plan?

Q. 5 (a) The ICT has gathered data on the number of minor traffic accident and the number of youth soccer games that occurred in town over a weekend.

X (Soccer games)	20	30	10	12	15	25	34
Y (Minor accident)	6	9	4	5	7	8	9

- (i) Plot these data.  
 (ii) Develop the estimating equation that best describes these data.  
 (iii) Predict the number of minor traffic accidents that will occur on a weekend during which 33 soccer games take place.  
 (iv) Calculate the standard error of estimate.

- (b) City Bank is interested in reducing the amount of time people spend waiting to see a personal banker. The bank is interested in the relationship between waiting time (Y) in minutes and number of bankers on duty (X). Customers were randomly selected with the data given below:

X	2	3	5	4	2	6	1	3	4	3	3	2	4
Y	12.8	11.3	3.2	6.4	11.6	3.2	8.7	10.5	8.2	11.3	9.4	12.8	8.2

- (i) Calculate the regression equation that best fits the data.
- (ii) Calculate the sample coefficient of determination and the sample coefficient of correlation.