

تمام کلاسز کی حل شدہ مشقیں MrPakistani ویب سائٹ سے فری ڈاؤن لوڈ کریں۔

Allama Iqbal Open University Solved Assignments Spring 2026

Course Code:	1430 Code
Course Name:	Business Statistics
Class:	BA/BCom/AD
Total Credit Hours	3
Total Assignments	2

گھر بیٹھے حل شدہ مشقیں، گیس پیپرز، کتابیں اور خلاصے حاصل کرنے کے لیے رابطہ کریں واٹس ایپ نمبر: 03036940016

نوٹ: ہم طلبہ کے لیے جامع اور معیاری تعلیمی خدمات فراہم کرتے ہیں۔ ہماری خدمات میں علامہ اقبال اوپن یونیورسٹی کے حل شدہ اسائنمنٹس، گیس پیپرز، سابقہ پرچے، تازہ ملازمتوں کی معلومات، آن لائن سی وی تیار کرنا، ملازمت کے لیے درخواست دینا، یونیورسٹی داخلوں میں رہنمائی اور درخواست جمع کروانا شامل ہیں۔ اس کے علاوہ یونیورسٹی سے متعلق طلبہ کے ہر قسم کے تعلیمی اور رہنمائی کے کام میں مکمل تعاون فراہم کیا جاتا ہے تاکہ طلبہ کو ایک ہی جگہ پر تمام ضروری سہولیات میسر آسکیں۔



واٹس ایپ گروپ جوائن کرنے کے لیے سامنے دیے گئے لنک پر کلک کریں۔



واٹس ایپ چینل جوائن کرنے کے لیے سامنے دیے گئے لنک پر کلک کریں۔



یونیورسٹی کی تمام معلومات حاصل کرنے کے لیے ہمارا واٹس ایپ گروپ جوائن کریں۔

Assignment 1

Q1. Describe the formation of frequency distribution and characteristics of relative frequency distribution. (20)

Answer:

Formation of Frequency Distribution:

A frequency distribution is a tabular arrangement of data that shows how often each value (or group of values) occurs. Steps to form a frequency distribution:

1. **Arrange data** – Sort raw data in ascending order (data array).
2. **Determine range** – Range = Maximum value – Minimum value.
3. **Decide number of classes** – Usually 5–20 classes; use Sturges' rule: $k = 1 + 3.322 \log_{10}(n)$.
4. **Calculate class width** – Width = Range / Number of classes (round up to convenient number).
5. **Establish class limits** – Lower limit of first class near minimum, then add width.
6. **Tally frequencies** – Count observations falling into each class.
7. **Present table** – Columns: class limits, tally, frequency.

Characteristics of Relative Frequency Distribution:

Relative frequency distribution shows the proportion (or percentage) of total observations in each class: Relative frequency = $\frac{\text{Class frequency}}{n}$.

Characteristics:

- Sum of relative frequencies equals 1 (or 100%).
- Allows comparison between datasets of different sizes.
- Can be displayed as a histogram or pie chart.
- Cumulative relative frequency shows proportion below a certain value.
- Independent of sample size; facilitates probability interpretation.
- Does not change if data are scaled linearly.



Q2. Transmission ABC stores recorded the number of service tickets submitted by 50 stores last month as follows:

(Data given)

(a) Arrange the data using Data Array and Frequency Distribution. (10)

(b) Which arrangement do you prefer? Explain. (10)

Answer:

(a) Data Array (sorted ascending):

114, 115, 150, 163, 163, 217, 227, 305, 308, 321, 334, 349, 360, 365, 413, 416, 427, 439, 441, 468, 550, 555, 586, 588, 607, 624, 634, 641, 648, 662, 669, 687, 718, 722, 752, 763, 766, 791, 810, 823, 842, 846, 847, 860, 904, 919, 924, 957, 960, 981

Frequency Distribution (using 7 classes for illustration):

Range = 981 – 114 = 867. Class width $\approx 867/7 \approx 124 \rightarrow$ use 125.

Classes: 100–224, 225–349, 350–474, 475–599, 600–724, 725–849, 850–974, 975–1099? Actually adjust.

Better to use 8 classes with width 110: 110–219, 220–329, 330–439, 440–549, 550–659, 660–769, 770–879, 880–989.

Class Limits	Frequency
110 – 219	6
220 – 329	5
330 – 439	7
440 – 549	2
550 – 659	8
660 – 769	10
770 – 879	6
880 – 989	6
Total	50



(b) Preference:

I prefer the **frequency distribution** because it summarises data into meaningful groups, making patterns (e.g., concentration around 660–769) visible at a glance. The data array is useful for finding exact order statistics but becomes cumbersome for large datasets. Frequency distribution facilitates further analysis like histograms, central tendency, and dispersion.

Q3. (a) Describe different measures of central tendency. (10)

(b) Ages of 48 members (data given). Obtain (i) median, (ii) mode, (iii) range, and coefficient of range. (10)

Answer:

(a) Measures of central tendency:

- **Mean (Arithmetic Mean):** Sum of all values divided by number of observations. Sensitive to extreme values.
- **Median:** Middle value when data are sorted; for even n, average of two middle values. Not affected by outliers.
- **Mode:** Most frequently occurring value. A distribution may have one mode (unimodal), two (bimodal), or more.
- **Geometric Mean:** $\sqrt[n]{x_1 x_2 \cdots x_n}$; used for rates, ratios.
- **Harmonic Mean:** Reciprocal of mean of reciprocals; used for average speeds.

(b) Ages sorted (ascending):

38, 42, 44, 47, 51, 51, 51, 54, 55, 56, 56, 60, 60, 61, 62, 64, 65, 65, 65, 66, 66, 66, 67, 68, 68, 68, 69, 70, 71, 74, 74, 75, 76, 77, 78, 79, 80, 81, 82, 82, 83, 83, 84, 87, 88, 91, 92, 98

n = 48 (even).

(i) Median = average of 24th and 25th values.

24th = 68, 25th = 68 → Median = $(68 + 68)/2 = 68$

(ii) Mode = most frequent value.

Count: 51 appears 3 times; 65 appears 3 times; 66 appears 3 times; 68 appears 3 times. →

Multimodal: modes are 51, 65, 66, 68.



(iii) Range = Max – Min = 98 – 38 = 60

(iv) Coefficient of Range = $\frac{\text{Max}-\text{Min}}{\text{Max}+\text{Min}} = \frac{98-38}{98+38} = \frac{60}{136} = 0.4412$

Q4. From the following data, calculate (i) mean, (ii) geometric mean, (iii) standard deviation and (iv) coefficient of variation (CV).

Classes: 1-7, 8-14, 15-21, 22-28, 29-35, 36-42, 43-49

Frequencies: 45, 32, 34, 22, 20, 12, 9

Answer:

First find class midpoints (x):

$(1+7)/2=4, (8+14)/2=11, (15+21)/2=18, (22+28)/2=25, (29+35)/2=32, (36+42)/2=39, (43+49)/2=46.$

Class	Mid (x)	f	fx	fx ²	log x	f·log x
1-7	4	45	180	720	0.60206	27.0927
8-14	11	32	352	3872	1.04139	33.3245
15-21	18	34	612	11016	1.25527	42.6792
22-28	25	22	550	13750	1.39794	30.7547
29-35	32	20	640	20480	1.50515	30.1030
36-42	39	12	468	18252	1.59106	19.0927
43-49	46	9	414	19044	1.66276	14.9648
Total		174	3216	87134		198.0116

$n = \Sigma f = 174$

(i) Mean $\bar{x} = \frac{\Sigma fx}{n} = \frac{3216}{174} \approx 18.4828$

(ii) Geometric Mean

$\log(GM) = \frac{\Sigma f \log x}{n} = \frac{198.0116}{174} \approx 1.1380$

$GM = 10^{1.1380} \approx 13.73$ (or using natural log, similar)

Alternatively: $GM = \left(\prod x_i^{f_i} \right)^{1/n}$. Result ≈ 13.73 .



(iii) Standard Deviation

$$\sigma = \sqrt{\frac{\sum fx^2}{n} - \left(\frac{\sum fx}{n}\right)^2}$$

$$\frac{\sum fx^2}{n} = \frac{87134}{174} \approx 500.7701$$

$$\bar{x}^2 = (18.4828)^2 \approx 341.61$$

$$\sigma = \sqrt{500.7701 - 341.61} = \sqrt{159.1601} \approx 12.616$$

(iv) Coefficient of Variation

$$CV = \frac{\sigma}{\bar{x}} \times 100\% = \frac{12.616}{18.4828} \times 100\% \approx 68.26\%$$

Q5. (a) Discuss the basic concepts in the hypothesis-testing procedure. (10)

(b) Average commission 144, $\sigma = 52$, sample $n=121$, mean=\$151, $\alpha=0.10$. Can Joel conclude his clients' commissions are higher than industry average? (10)

Answer:

(a) Basic concepts in hypothesis testing:

- **Null hypothesis (H_0):** Statement of no effect or no difference. Assumed true until evidence contradicts.
- **Alternative hypothesis (H_1 or H_a):** Opposite of H_0 ; what researcher wants to prove.
- **Test statistic:** Calculated from sample data (e.g., z , t , χ^2) used to decide.
- **Significance level (α):** Probability of rejecting H_0 when true (Type I error). Commonly 0.05, 0.01, 0.10.
- **Critical region:** Set of test statistic values leading to rejection of H_0 .
- **p-value:** Probability of obtaining test statistic as extreme as observed, assuming H_0 true. If $p < \alpha$, reject H_0 .
- **Type II error (β):** Failing to reject false H_0 . Power = $1-\beta$.
- **Decision rule:** Compare test statistic to critical value or p-value to α .

(b) One-sample z-test (upper-tailed):

$H_0: \mu = 144$ (industry average)

$H_1: \mu > 144$ (clients' commissions higher)

Known $\sigma = 52$, $n = 121 \rightarrow$ standard error = $\frac{52}{\sqrt{121}} = \frac{52}{11} = 4.7273$

Test statistic: $z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}} = \frac{151-144}{4.7273} = \frac{7}{4.7273} \approx 1.48$



