

SOLVED PROBLEMS

**INTRODUCTION TO
STATISTICAL
THEORY**

PART- I



ILMI KITAB KHANA

Kabir Street, Urdu Bazar, Lahore.

SOLVED PROBLEMS INTRODUCTION TO STATISTICAL THEORY

PART I

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A NOTE TO READERS

THOSE QUESTIONS WHOSE ANSWERS/
SOLUTIONS DIRECTLY APPEAR IN THE
TEXT, UNDER DIFFERENT SECTIONS, HAVE
BEEN OMITTED IN ORDER TO DECREASE THE
BULK OF THE BOOK

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Chapter 1

INTRODUCTION

- 1.9 (b)(i) The number of students attending a class is a *discrete* variable.
- (ii) The amount of milk produced by a cow is a *continuous* variable.
- (iii) The number of heads in the toss of 6 coins is a *discrete* variable.
- (iv) The yearly income of a College Professor is a *discrete* variable.
- (v) The age of a shopkeeper is a *continuous* variable.
- (vi) The weight of a college student is a *continuous* variable.
- (vii) The number of petals on a flower is a *discrete* variable.
- (viii) The life time of television tubes produced by a company is a *continuous* variable.
- (ix) Temperature recorded every half hour at a weather bureau is a *continuous* variable.
- (x) The number of shares sold each day in the stock market is a *discrete* variable.

- 1.10 (i) Qualitative, (ii) Quantitative,
(iii) Qualitative, (iv) Quantitative,
(v) Quantitative, (vi) Quantitative,
(vii) Qualitative.

- 1.11 (i) Ratio, (ii) Ordinal,
(iii) Interval, (iv) Ratio,
(v) Nominal, (vi) Ratio,
(vii) Ordinal, (viii) Ratio,
(ix) Ordinal, (x) Ratio.

- 1.12 (i) 32.21705 rounded off to four significant digits becomes 32.22.
- (ii) 937.05002 rounded off to four significant digits becomes 937.1. We increase zero preceding 5 by 1 as 5 is followed by a non-zero digit.
- (iii) 0.003599499 rounded to four significant digits becomes 0.003599 because beginning zeros are not significant but they serve only to locate the decimal point.
- (iv) 1.003599499 rounded to four significant digits becomes 1.004.
- (v) 0.07000455 rounded to four significant digits becomes 0.07000.
- (vi) 22.2500001 rounded to four significant digits becomes 22.26.

Chapter 2

PRESENTATION OF DATA

2.4 Presentation of the data given in the paragraph in the form of a Table.

DISTRIBUTION OF EMPLOYEES OF THE JOHN SMITH MANUFACTURING COMPANY BY SEX AND MEMBERSHIP DURING 1941-44.

Year	All			Union			Non-Union		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1941	1650	1430	220	1250	1170	80	400	260	140
1942	1725	1500	225	1475	1300	175	250	200	50
1943	1750	1500	250	1700	1460	240	50	40	10
1944	2000	1700	300	1980	1685	295	20	15	5

Source: Census of Manufacturers Report, 1945.

2.5 (b) Determination of class-boundaries, class-limits, etc.

(i) Here the smallest weight = 98 lb, the largest weight = 226 lb.

\therefore Range = $226 - 98 = 128$ and $n = 300$.

Let us take h (class-interval) = 10 lb and the lower limit of the first class as 95 lb. The last class is to include the highest value of 226 lb. The required values are:

Classes	Class-limits	Class-boundaries	Class-mark
First	95 - 104	94.5 - 104.5	99.5
⋮	⋮	⋮	⋮
Last	225 - 234	224.5 - 234.5	229.5

(ii) The smallest observation = 0.421 and the largest observation = 0.563, so that range = $0.563 - 0.421 = 0.142$. $n = 460$. Let us decide to have about 8 classes.

Then $h = \frac{0.142}{8} = 0.020$ approximately and we may take

the lower limit of the lowest class as 0.420.