

∴ Sampling ∴

Bs-III
English
Short notes

→ Populations:-

It consist of all elements, individuals, items, events or observation.

→ Types of Popⁿ.

- i) Finite popⁿ
- ii) Infinite popⁿ

Finite Popⁿ..

A popⁿ is finite if it consist of limited number of elements.

e.g no. of students in class.

Infinite Popⁿ..

A popⁿ is infinite if it consist of unlimited no. of elements.

e.g Stars in the sky.

→ Types of Sampler

Random sample /
Prob Sample
(Each unit is known)

Non-random Sample /
Non-Prob. Sample.
(Personal Judgment is involved).

Types of Simple

Random Sampling:-

- Stratified Random Sampling
- Systematic Sampling

Cluster Sampling.

Types of Non-Random

Sampling:-

Purposive Sampling

Quota Sampling

Sampling Techniques :-

①

Sampling Method are broadly classified as

- 1- Probability Sampling
- 2- Non-Probability Sampling

* Probability Sampling:

a Probability Sampling in which every Unit in the Population has a chance (greater than zero) of being selected in the Sample, and this Probability can be accurately determined. the Sampling is said to be Probability Sampling. A Probability Sampling is also called random Sampling.

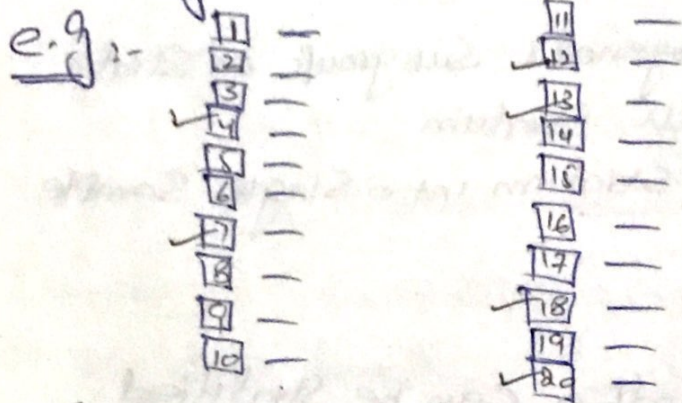
The Major types of Probability Sampling are

- 1- Simple random Sampling
- 2- Stratified random Sampling
- 3- Systematic random Sampling
- 4- Cluster Sampling.

→ Probability Sampling

* Simple Random Sampling :-

Simple Random Sampling is a Method of Probability Sampling in which every unit has an equal non zero chance of being selected.

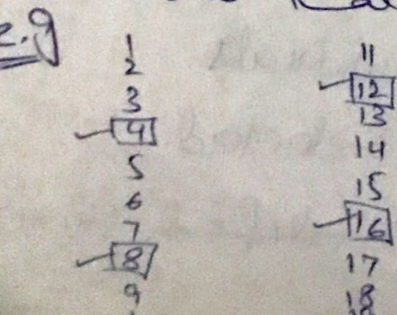


* Systematic Random Sampling :-

Systematic random sampling is a method of Probability Sampling in which the defined target population is ordered and the sample is selected according to position using a skip interval.

Steps in Drawing a systematic Random Sample.

1. obtain a list of units that contains an acceptable frame of the target population.
2. Determine the no. of units in the list and the desired sample size.
3. compute the skip interval.
4. Determine random start point.
5. Beginning at the start point, select the units by choosing each unit that corresponds to the skip interval.



Stratified Random Sampling (4) b/w groups → Heterogeneous
within groups → Homogeneous

Stratified Random Sampling is a Method of Probability Sampling which dividing the members of the Population into Sub-Population or Sub groups called Strata then selecting a random sample from each stratum.

- The Strata should be Mutually exclusive. (No common point)
- Steps in Drawing a Stratified Random Sample.
 1. Divide the target Popⁿ into Homogeneous Subgroups or Strata.
 2. Draw Random Samples from each stratum
 3. combine the samples from each stratum into single sample of the target Population.

Example:-

- Student of the University of Sargodha can be stratified by different departments.
- Departments can be stratified by different classes.
- Population of country can be stratified by Provinces.
- A Population of School Students can be stratified by class.
- * Cluster Sampling: Each Member of the Study Population is assigned to groups or cluster then clusters are selected at random and members of a selected cluster are include in the Sample.
 - cluster sampling is an example of two stage sampling.
 - first stage a sample of areas is chosen.
 - second stage a sample of Respondents within those areas is selected.
 - Popⁿ divided into clusters of homogeneous units, usually based on geographical contiguity.
 - Sampling units are groups rather than individuals.
 - A sample of such clusters is then selected.
 - All units from the selected clusters are stratified. studied

② Non-Probability Sampling :- It is also called non-random sampling

Non-Probability Sampling is any Sampling Method where some elements of the Population have no chance of selection or where the Probability of selection can't be accurately determined.

→ It involves the selection of elements based on assumptions regarding the Population of interest which forms the criteria for selection.

→ It is Process in which Personal Judgement determines which unit of the Population are selected for a sample.

⇒ The Major types of Non-Probability Sampling are.

1. ~~Convenience~~ Sampling.

2. Judgment Sampling.

3. Quota Sampling.

4. Snowball Sampling.

x ————— x

Non Probability Sampling

* Convenience Sampling :-

The sampling procedure of obtaining the people or units that are most conveniently available.

Example :-

- The first 100 customers to enter a departmental store.
- The first three callers in a radio contest. (3)

* Snowball Sampling :- The first respondent refers to next and then a chain starts.
Some population that we are interested in studying can be hard-to-reach or hidden.

Example :- drug addicts, HIV, Homeless people.

* Judgemental Sampling :-

The researcher chooses the sample based on who they think would be appropriate for the study. This is used mainly when there is limited number of people that have expertise in the area being researched.

* Quota Sampling :-

In quota sampling the selection of the sample is made by the university interviewer, who has been given quotas to fill from specified sub groups of the population.

example :-

An interviewer may be told to sample 50 females between the age of 45 and 60.

→ Ways of Selection of Samples

With Replacement

Possible sample $(N)^n$

→ Sampling

with Replacement:-

When from a finite popⁿ a sampling unit is drawn

& then returned to popⁿ before another unit is

drawn. The popⁿ in this case remains the same

& a sampling unit might be selected more than

once.

Without Replacement

Possible sample $N C_n$

$$= \frac{N!}{n!(N-n)!}$$

Sampling Without Replacement:-

Sampling is said to be without replacement from a finite popⁿ a sampling unit is drawn & then not returned to the popⁿ before another unit is drawn. The popⁿ in this case not remain the same.

Example:-

$$n = 2$$

a, b, c, d, e

$$W.R \quad (N)^n = (5)^2 = 25$$

$$W.O.R = {}^N C_n = {}^5 C_2 = 10$$

a a
a b
a c
a d
a e
b a
b b
b c
b d
b e
c a
c b
c c
c d
c e

d a
d b
d c
d d
d e
e a
e b
e c
e d
e e

ab
ac
ad
ae
bc
bd
be
cd
ce
de

⇒ Question:-

Given the popⁿ single digit even integers
 2, 4, 6, 8

(a) List all possible sample of size 2 W.R.E.P
 W.O.R & their mean.

W.R. = $(N)^n = (4)^2 = 16$

Sample	Mean \bar{x}	$f(\bar{x})$	$\bar{x}f(\bar{x})$
2, 2	$\frac{2+2}{2} = \frac{4}{2} = 2$	1	2/16
2, 4	$\frac{2+4}{2} = \frac{6}{2} = 3$	2	6/16
2, 6	$\frac{2+6}{2} = \frac{8}{2} = 4$	3	12/16
2, 8	$\frac{2+8}{2} = \frac{10}{2} = 5$	4	20/16
4, 2	3	3	18/16
4, 4	4	2	14/16
4, 6	5	1	8/16
4, 8	6	1	8/16
6, 2	4	1	4/16
6, 4	5	1	5/16
6, 6	6	1	6/16
6, 8	7	1	7/16
8, 2	5	1	5/16
8, 4	6	1	6/16
8, 6	7	1	7/16
8, 8	8	1	8/16
Total		16	80/16 = 5

Mean = $\mu_x = \sum \bar{x}f(\bar{x}) = 5$

Variance = $\sum \bar{x}^2 f(\bar{x}) - [\sum \bar{x}f(\bar{x})]^2$

~~$f(\bar{x}) = \frac{f}{\sum f}$~~

$f(\bar{x}) = \frac{f}{\sum f}$

1.0.R =

$N C_5$

$= 2$

$4 C_2$

$= 6$

2, 4

$$\frac{2+4}{2} = 3$$

2, 6

4

2, 8

5

4, 6

5

4, 8

6

6, 8

7

\bar{X}

f

f(\bar{X})

$\bar{X} f(\bar{X})$

3

1

$\frac{1}{6}$

$\frac{3}{6}$

4

1

$\frac{1}{6}$

$\frac{4}{6}$

5

2

$\frac{2}{6}$

$\frac{10}{6}$

6

1

$\frac{1}{6}$

$\frac{6}{6}$

7

1

$\frac{1}{6}$

$\frac{7}{6}$

6

$\frac{1}{6}$

$\frac{30}{6} = 5$

$$M_x = \sum \bar{X} f(\bar{X}) = 5$$