Joy Matubber
20-41959-1

Assignment-2

Serial = 07
Section :- O

9.4

Observation (x)	5	8	7	10	7	6	9	11	4	2	7	7	12	9
Serial Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Observation (x)	11	3	7	8	5	6	7	6	9	11	4			
Serial Number	15	16	17	18	19	20	21	22	23	24	25			

a) Here, population size $N = 25$

Sample size $n = 4$

Sampling Interval $k = \frac{N}{n} = \frac{25}{4} = 6.25 \approx 6$

Now,

$1 - k = 1 - 6$

So, selected sample is, 5, 11, 17, 23

Now,

Random Number	5	11	17	23
Signals received	7	7	7	9

NOW,

$$s^2 = \frac{1}{n-1}\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]$$

$$= \frac{1}{3}\left[228 - 225\right] = 1$$

$$v(\bar{x}) = \frac{N-n}{Nn}(s^2) = \frac{25-4}{25\times 4} \times 1 = 0.21$$

And,

$$\bar{x} = \sqrt{v(\bar{x})} = \sqrt{0.21} = 0.45$$

The Estimate of standard error of estimate of population total is,

$$v(\bar{x}) = N^2 v(\bar{x})$$

And, $= 25^2 \times 0.45 = 286.41$

$$\bar{X} = \sqrt{v(\bar{x})}$$

$$= \sqrt{286.41} = 16.92$$

(b) Estimate the proportion of days which less than 8 signals are received.

In Our ~~population~~ sample there are 3 signal are less than 8. so, $a = 3$

$$\text{So, } p = \frac{a}{n} = \frac{3}{4} = 0.75$$

9.5

Observation (x)	4	3	0	2	6	7	4	3	2	0	1	0	3	0	6
Serial Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observation (x)	8	0	1	4	3	2	6	3	7	5	8	0	2	3	5
Serial Number	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Now,
use simple random sampling methode

The 5 random days are,
11, 16, 09, 12, 19

Random Number	11	16	09	12	19
Signal Faded	1	8	2	0	4

Now,

$$s^2 = \frac{1}{n-1}\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]$$

$$= \frac{1}{4}\left[85 - 45\right] = \frac{40}{4} = 10$$

The variance of sample mean is $v(\bar{x}) = \frac{N-n}{Nn}(s^2)$

$$= \frac{30-5}{30\times 5}(10)$$

$$= 1.67$$

And,

$$\bar{x} = \sqrt{v(\bar{x})} = \sqrt{1.67} = 1.29$$

The stimate of standard error of estimate of population total is,

$$v(\bar{x}) = N^2 v(\bar{x}) = 30^2 \times 1.67 = 1503$$

and, $\bar{x} = \sqrt{v(\bar{x})} = \sqrt{1530}$

$= 38.76$

9.6

Given that.

Margin of error $d = 0.1$

$p = 0.45$

$q = 0.55$

And, $z = 1.96$

The sample size n is given by,

$$n = \frac{z^2 pq}{d^2}$$

$$= \frac{(1.96)^2 \times 0.45 \times 0.55}{(0.1)^2}$$

$$= 95.07$$

$$= 95$$

9.7

Observation (x)	10	7	6	9	11	4	2	7	7	9	11	45
Serial Number	1	2	3	4	5	6	7	8	9	10	11	12
Observation (x)	8	7	10	7	6	9	11	4	2	7	7	
Serial Number	13	14	15	16	17	18	19	20	21	22	23	

Use simple random sampling ~~sere~~ selected 4 days are

11, 16, 9, 12

Now,

Random Number	11	16	9	12
Mails received	11	7	7	45

NOW,

$$s^2 = \frac{1}{n-1}\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right] = \frac{1}{3}(2244 - 49^2/25)$$

$$= 339.67$$

The variance of sample mean is,

$$V(\bar{x}) = \frac{N-n}{Nn} s^2 = \frac{23-4}{23\times 4}(339.67)$$

$$= 70.14$$

The ~~standard~~ error of estimate of mean is,

$$\bar{x} = \sqrt{V(\bar{x})} = \sqrt{70.14}$$

$$= 8.37$$

9.8

Given that, Margin of error $d = 0.05$

$$p = 0.3$$

$$q = 0.7$$

And $z = 1.96$

The sample size n is given by

$$n = \frac{z^2 pq}{d^2}$$

$$= \frac{(1.96)^2 \times 0.3 \times 0.7}{(0.05)^2}$$

$$= 322.69$$

$$= 322$$