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Assignments-2

9.4| We Know,

Sampling interval, $K = \frac{N}{n}$

$= \frac{25}{4} = 6.25 \approx 6$

Here, $K=6$ and 6 is one digit number, we need to findout only me value (first value) between (1-K) and it must be less from the value of K.

Rendom Number	5	11	17	23
Signal Recived	7	7	7	9

Ovsenbation (x)	~~6~~ 5	8	7	10	7	6	9	11	4	2	7	7	12
Serial No	1	2	3	4	5	6	7	8	9	10	11	12	13

Ovsenbation (x)	9	11	3	7	8	5	6	7	6	9	11	4
Serial No	14	15	16	17	18	19	20	21	22	23	24	25

a) Here,

$$\text{mean}, (\bar{x}) = \frac{30}{4}$$

$$= 7.5$$

$\therefore$ Total number $= N\bar{x}$

$$= (25 \times 7.5)$$

$$= 187.5$$

$\therefore$ standard error of total $= s.e(\hat{x}) = \sqrt{V(\hat{x})}$

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

Here,

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

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

$$= \frac{1}{3}\left|228 - \frac{(30)^2}{4}\right|$$

$$= 1$$

$\therefore V(\hat{n}) = \frac{25-4}{25 \times 4}(1)$

$= 0.21$

$\therefore V(\hat{n}) = (25)^2 \times (0.21)$

$= 131.25$

Now, $s.e(\hat{X}) = \sqrt{V(\hat{X})}$

$= \sqrt{131.25} = 11.46$ Ans.

b) The Poportion of days which less than 8 days is given by $P = \frac{a}{n}$.

Here, $a = 3$ [Number of days which less than 8]

$n = 4$ [given];

$P = \frac{3}{4}$

$= 0.75$ Ans

9.5]

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

Here,
$N=30$. We need to select sample size, $n=5$ using Random table. As, $N=28$ which is 2 digits ~~n~~ number. So, we need to select random number of two digits.

Random no.	11	16	09	12	19
Faded out signals	1	8	2	0	4

$$\therefore \text{Mean} = \frac{1}{n}\sum x = \frac{15}{5} = 3$$

$\therefore$ Estimate total, $\hat{x} = N\bar{x}$

$$= 30 \times 3$$

$$= 90$$

Standard error of total, $s.e(\hat{X}) = \sqrt{V(\hat{X})}$

Here,

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

$$\therefore V(\bar{x}) = \frac{N-n}{Nn} s^2$$

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

$$= \frac{1}{4}\left|85 - \frac{(15)^2}{5}\right|$$

$$= \frac{1}{4} \times 40$$

$$= 10$$

$$\therefore V(\bar{x}) = \frac{30-5}{30 \times 5} \times 10$$

$$= 1.67$$

$\therefore$ Variance, $V(\hat{x}) = (30)^2 \cdot (1.67)$

$$= 1503$$

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$\therefore$ Standard error of total. $s.e(\hat{x}) = \sqrt{v(\hat{x})}$

$$= \sqrt{1503}$$

$$= 38.77$$

Ans.

9.6

Here,

$p = 0.45,\ q = 0.55$

$d = 0.1$

We know,

The sample size n is given by,

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

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

$$= 95$$

9.7)

X	10	7	6	9	11	4	2	7	7	9	11	45	8	7
Serial No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
X	10	7	6	9	11	4	2	7	7					
Serial No.	15	16	17	18	19	20	21	22	23					

Here, $N=23$ which is 2 digits. So, we need to select Random number of 2 digits upto 4 sample, by following Random number Table.

Random Number	11	16	09	12
Mails received	11	7	7	45

$\therefore$ Mean $= \frac{1}{n}\sum x = \frac{70}{4} = 17.4 \approx 17$

$\therefore$ standard error of mean, $s.e(\bar{x}) = \sqrt{V(\bar{x})}$

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Here,

Variance, $v(\bar{x}) = \frac{N-n}{Nn} s^2$

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

$= \frac{1}{3} \left| 2244 - \frac{4900}{4} \right|$

$= 339.67$

$\therefore v(\bar{x}) = \frac{23-4}{23 \times 4} \times 339.67$

$= 70.15$

Standard error of Mean, $s.e(\bar{x}) = \sqrt{v(\bar{x})}$

$= \sqrt{70.15}$

$= 8.38$

Ans,

9·8)

Here,

$p = 0.3, \quad q = 0.7$

$d = 0.05, \quad n = ?$

We know,

The sample size of, $n = \dfrac{z^2 pq}{d^2}$

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

$\cancel{= 332}$

$\therefore n = 322.69$

Ans.