Assignment - 2

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9.4

$$k = \frac{N}{n}$$

$$= \frac{25}{4}$$

$$= 6.25 \sim 6$$

$k = 6$ is an one digit number. We need to find the first value.

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

Observation (x)	5	8	7	10	7	6	9	11	4	2	7	7	
Serial no.	1	2	3	4	5	6	7	8	9	10	11	12	
Observation(x)	12	9	11	3	7	8	5	6	7	6	9	11	4
Serial no.	13	14	15	16	17	18	19	20	21	22	23	24	25

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

$= 7.5$

Total number $= N\bar{x}$

$= (25 \times 7.5)$

$= 187.5$

∴ standard error of total $se(\hat{x}) = \sqrt{v(\hat{x})}$

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

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

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

$= \frac{1}{3}\left[220 - \frac{(30)^2}{4}\right]$

$= 1$

∴ $v(\hat{x}) = \frac{25-4}{25 \times 4}(1)$

$= 0.21$

∴ $v(\hat{x}) = (2.5)^2 \times (0.21)$

$= 131.25$

$se.(\hat{x}) = \sqrt{v(\hat{x})}$

$= \sqrt{131.25}$

$= 11.46.$ (Ans)

9.5

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

$N = 30$

$n = 5$ as 2 digit number

Random no.	11	16	9	12	19
faded out signals	1	8	2	0	9

$$\text{mean} = \frac{1}{n}\Sigma n$$

$$= \frac{15}{5}$$

$$= 3$$

Estimated total $\hat{x} = N\bar{x}$

$$= 30 \times 3$$

$$= 9$$

standard error of total $se(\bar{x}) = \sqrt{V(\bar{x})}$

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

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

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

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

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

$= 10$

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

$= 1.67$

variance, $V(\bar{x}) = (30)^2 \cdot (1.67)$

$= 1503$

Standard error of total,

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

$= \sqrt{1503}$

$= 38.77.$ (Ans.)

9.6 given,

$p = 0.45$

$q = 0.55$

$d = 0.1$

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

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

$$= 95$$

9.7

observation (x)	10	7	6	9	11	4	2	7	7	9	11	45
Serial no.	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 no.	13	14	15	16	17	18	19	20	21	22	23	24

$N = 23$ sample = 4

Random number	11	16	9	12
mails received	11	7	7	45

$$\therefore \text{mean} = \frac{1}{n}\Sigma x$$

$$= \frac{70}{4}$$

$$= 17.4 \sim 17$$

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

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

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

$$= \frac{1}{3}\left[2244 - \frac{9900}{4}\right]$$

$$= 339.67$$

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

$$= 70.15$$

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

$$= \sqrt{70.15}$$

$$= 8.30.$$

(Ans.)

9.8

$p = 0.3$

$q = 0.7$

$d = 0.05$

$n = ?$

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

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

$= 322.69$.

(Ans)