Name: Rifath Bin Mashrur Serial: 10
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Ans to the Que No: 4

serial numbers	1	2	3	4	5	6	7	8	9	10
observations	5	8	7	10	7	6	9	11	4	2
serial numbers	11	12	13	14	15	16	17	18	19	20
observations	7	7	12	9	11	3	7	8	5	6
serial numbers	21	22	23	24	25					
observations	7	6	9	11	4					

a)

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

Here the population size, N = 25

sample = 4

Sampling interval, $K = \frac{25}{4} = 6.25 \simeq 6$

Now, 1 to 6; any random number is 5

Hence,

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

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$$= \frac{1}{4-1}\left[(7^2+7^2+7^2+9^2) - \frac{(7+7+7+9)^2}{4}\right]$$

$$= 1$$

Variance of sample mean $v(\bar{x})$

$$= \frac{N-n}{Nn} \times s^2$$

$$= \frac{25-4}{25\times 4} \times (1)^2 = 0.21$$

Hence, standard error of estimates of mean $= \sqrt{v_2(\bar{x})}$

$$= \sqrt{0.21} = 0.458$$

The estimate of standard error Population total is

$$v(\bar{x}) = N^2 v(\bar{x}) - (25)^2 \times 0.25$$

$$= 133.25$$

$$\bar{x} = \sqrt{v(\bar{x})} = \sqrt{131.25} = 11.46$$

(Ans)

(b) Proportion, $P = \frac{3}{4} = 0.75$

(Ans)

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Serial - 10

Ans to the Que No:- 9.5

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

Using by simple random sampling method

Random number	11	16	9	12	19
Observation	1	8	2	0	4

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

$$= \frac{1}{5-1} \left[1^2 + 8^2 + 2^2 + 0^2 + 4^2 \right) - \left(\frac{1+8+2+0+4}{5} \right)^2 \Bigg]$$

$= 10$

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Variance of sample mean.

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

$$= \frac{30-5}{30 \times 5} \times (10)^2$$

$$= 1.67$$

Here, standared error of estimate of mean $= \sqrt{V(\bar{x})} = \sqrt{1.67}$

$$= 1.292$$

The estimate of standard error Population total is.

$$V(\hat{x}) = N^2 V(\bar{x}) = (30)^2 \times 1.67$$

$$= 1503$$

$$\bar{x} = \sqrt{V(x)} = \sqrt{1503} = 38.77$$

(Ans)

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Serial-10

Ans to the Que No-9.6

Here, Proportion $P = 0.45$

Margin of error, $d = 0.1$

Size, $n = \frac{Z^2 \cdot pq}{d^2}$

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

$= 95.08 \approx 95$ (Ans)

Ans to the Que No-9.7

serial number	1	2	3	4	5	6	7	8
observation	10	7	6	9	21	4	2	7
serial number	9	10	11	12	13	14	15	16
observation	7	9	11	45	8	7	10	7
serial number	17	18	19	20	21	22	23	
observation	6	9	11	4	2	7	7	

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serial-10

Here, $N = 23$ and $n = 4$

Using by simple random sampling method,

Pospodays	11	16	19	12
Observation	11	7	7	45

$$s^2 = \frac{1}{n-1} \times \left[(11^2 + 7^2 + 7^2 + 45^2) - \frac{(11+7+7+45)^2}{4} \right]$$

$$= 339.67$$

Variance of sample mean; $V(\bar{x})$

$$= \frac{N-n}{Nn} \times s^2$$

$$= \frac{23-4}{23 \times 4} \times 339.67$$

$$= 70.15$$

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serial - 10

standard error of estimate of mean $= \sqrt{V(\bar{x})} = \sqrt{70.15}$

$= 8.376$ (Ans)

Ans to the Que No 9.8

Here,

Proportion $P = 0.3$

Margin of error $= 0.05$

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

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

$$= 322.694 \simeq 323$$

(Ans)

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