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Serial no: 08

20-42006-1

9.4. a/ Here the population size is 25

and sample size 4

So, Sampling interval $k = \frac{N}{n} = \frac{25}{4} = 6.25 \approx 6$

Now $1-k = 1-6$ any random number $1-k$ is 5

Select numbers 5, 11, 17, 23

Serial	5	11	17	23
observation value	7	7	7	9

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

$= \frac{1}{4-1}\left[228 - \frac{900}{4}\right] = 1$

$V(\bar{x}) = \frac{N-n}{Nn} s^2 = \frac{25-4}{25\times4}$

$\times (1)^2 = \frac{21}{100} = 0.21$

And $\hat{\sigma} \sqrt{v(\bar{x})} = \sqrt{0.21} = 0.4583$

the estimate of standard error of population

total in

$v(\hat{x}) = N^2 (v \bar{x}) = 25^2 \times 0.21 = 131.25$

and $\hat{\sigma} = \sqrt{v(x)} = \sqrt{131.25} = 11.4569$

b. Estimated the population of days which less

than 8 signal are received.

In our selected sample there are 3 signal

are less then 8 so, $a = 3$

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

Q.5 using simple random sampling method

the 5 random numbers are 11, 16, 9, 12, 10

random number	11	16	9	12	10
observation	1	8	2	0	4

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

The variance of sample mean is $V(\bar{x}) =$

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

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

$$= 1.67$$

and $\bar{x} = \sqrt{V(\bar{x})} = \sqrt{1.67} = 1.292$

The estimated of standard error of population is

$V(\bar{x}) = N^2(\bar{x}) = 30^2 \times 1.67 = ~~150~~ 1503$

and $\bar{x} = \sqrt{V(x)} = \sqrt{1503} = 38.768$

9.6] Given that

margin of error $d = 0.1$

$P = 0.45$

$q = 0.55$

$z = 1.96$

The ~~sa~~ sample size is given by $n = \frac{z^2 p q}{d^2}$

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

$$= 95.07 \approx 95$$

9.7) Using simple random sampling selected

11, 16, 9, 12

Now

random days	11	16	9	12
observation	11	7	7	45

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

$$= \left[2244 - \frac{4900}{4}\right] = 339.67$$

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

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

$$= 70.15$$

The standard error of estimate of mean is

$$s_{\bar{x}} = \sqrt{V(\bar{x})} = \sqrt{70.15} = 8.37$$

7.b) Given that

margin of $d = 0.05$

$p = 0.3$

$q = 0.7$

and $z = 1.96$

The sample size n is given by $n = \dfrac{z^2 pq}{d^2}$

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

$$= 322.69 \approx 323$$