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Paper : Statistic

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QUESTION NO: 1

ANS: (a) - For Men overall mean consumption of fresh vegetable.

$$\text{Mean} = \frac{204+259+266+217}{4}$$

$$= 236.5$$

→ Mean of fruits:

$$\text{Mean} = \frac{31+45+69+105}{4} = 625$$

→ Mean of Rice:

$$\bar{x} = (367+337+269+246)/4$$

$$= 304.75$$

→ Mean of Fish

$$\bar{x} = \frac{23+28+31+44}{4}$$

$$= 31.5$$

→ for women

mean of fresh vegetables

$$\bar{x} = \frac{178+235+266+304}{4}$$

$$= 753$$

Mean of fruits:-

$$\bar{x} = \frac{28+46+70+121}{4}$$

$$= 66.25$$

Mean of Rice:

$$\bar{x} = \frac{315+276+243+220}{4}$$

$$= 263.5$$

Mean of Meat

$$\bar{x} = \frac{48+43+54+63}{4}$$

$$= 52$$

Mean of Fish:

$$\bar{x} = \frac{19+21+28+46}{4}$$

$$= 28.5$$

Combined Mean

Combined mean for Men

C.M of fresh vegetables

$$\bar{X}comb = \frac{\bar{x}n_1 + \bar{x}_1 n_2 \text{ —— } \bar{x}n_3}{n_1 + n_2 + \text{ —— } + n_3}$$

$$= [(236.5)(204)+(236.5)(259)+(236.5)(266)$$
$$(236.5)(47)] / 204+259+266+217$$

$$= 236.5$$

Combined Mean of Rice :-

$$\bar{x}_c = (367)(304.75) + (337)(304.75) + (269)(304.75) + (246)(304.75)$$

$$= \boxed{371.25}$$

Combined mean of Fish :-

$$\bar{x}_c = \frac{(23)(31.5) + (31.5)(28) + (31)(31.5)(44)}{23 + 28 + 31 + 44}$$

$$\bar{x}_c \boxed{= 31.5}$$

C. mean of Meat :-

$$\bar{x}_c = \frac{(69.25)(70) + (69.25)(62) + (69.25)(69) + (69.25)(70)}{70 + 61 + 69 + 70}$$

$$\bar{x}_c = \boxed{69.25}$$

Combined mean of woman :-

$$\bar{x}_c = \frac{[(245.75)(178) + (245.75)(235) + (245.75)(266) + (245.75)(304)]}{178 + 235 + 266 + 304}$$

$$\bar{x}_c \boxed{= 245.75}$$

Com. mean of Meat :-

$$\bar{X}_C = \frac{(52)(48)+(52)(43)+(52)(54)+(52)(63)}{48+43+54+63}$$

$$\bar{X}_C = \boxed{52}$$

Com. Mean of fish :-

$$\bar{X}_C \frac{(28.5)(19)+(28.5)(21)+(28.5)(28)+(28.5)(46)}{19+21+28+46}$$

$$\bar{X}_C = \boxed{28.5}$$

Com. Mean of Rise :-

$$\bar{X}_C = [(263.5)(315)+(263.5)(276)+(263.5)(243)+(263.5)(220)]$$

$$\bar{X}_C = \boxed{263.5}$$

Part (b) Q1

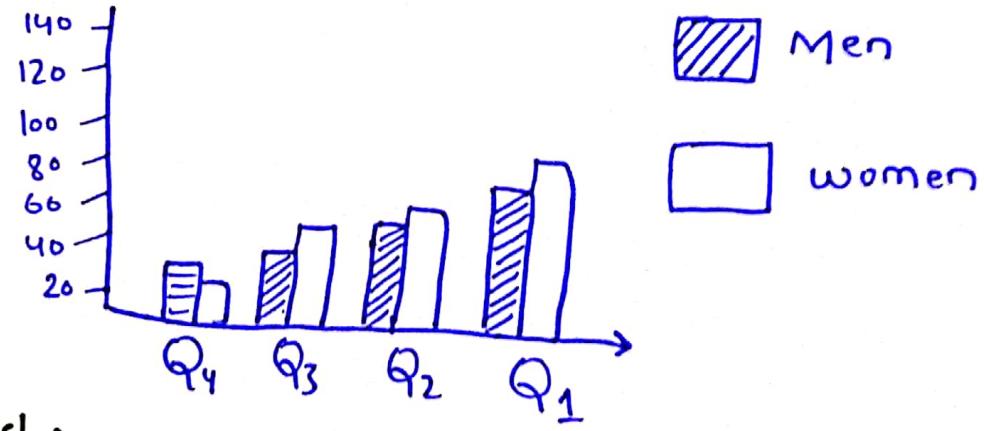
ANS:- Milk, root vegetable and wheat flour are very Low for both men and women. In Q_4 and Q_3 but it rises high in Q_2 and Q_1 so these who eat most vegetable Consume much more milk rot vegetable and wheat flour then those who eat less fresh vegetable.

Part (C)

ANS: In fruit and fish the value of mean incresing from Q_4 to Q_1 in men and women. But in Rice the value of mean decresing from Q_4 to Q_3

Part (d) Draw a suitable diagram

For fruits



For Fish:

Part (f)

Standard derivation = S.E $\times \sqrt{n}$

By using above formula the value of standard derivation of men in more then women wheat flour vegetables, fruit, wheat flour whole grain.

QUESTION NO 2

ANS:- Part (a)

The purpose of census is to count the the Entier population of a country and individuals at location where the Actuallylives. Census counts the number, of Living in the home, their Age, Sex and race. It helps in the forming and important bare for planing policy development and decreasing numbering

Part (b)

In census each and Every unit of the population is studies in the sampling. the census refer to perodic collection of inforation about the population from the Suitable to Use census method if the population Compare to sample Servay. Census Servay takes moretime however it is margin for error in sample Servay while census Servay is more Correct.

Part (d)

Ironic Responce to the census by the Public sigcrity there into ward attitude to the Servay and their cerelessuess in following accurate data Questeors of these types are invalidated with such abuse Responces.

Part (c)

Obviously not having a full responce Rate to the Census is problem for the Accuracy of Census as insufficient data will be collected to know about Population and of following base for Planing and policy development.

Part (e)

By using the information of given table it is true that men needs more foods to maintain its energy level.

Part (f)

Census, itself mean the study of every object under the observation. And in real it is such a difficult task to perform. Also it is quite difficult to government to go to every single person and collect the whole a lot of things that have been done by these agencies not only to of an error may increase error further.

QUESTION NO: 3

Rainfall	(f) No of years	x mid = Pi ants	fx	f/x	log(x)	f log(x)	$x-\bar{x}$	$(x-\bar{x})^2$	$f(x-\bar{x})^2$
20 – 24	1	22	22	0.046	1.34	1.34	−14.8	219.04	219.04
25 – 29	3	27	81	0.12	1.43	4.29	−9.8	96.04	288.12
30 – 34	5	32	160	0.15	150	7.5	4.8	23.04	115.2
35 – 39	8	37	296	0.21	1.56	12.48	0.2	0.04	0.32
40 – 44	5	42	210	0.11	1.62	8.1	5.2	27.04	135.2
45 – 49	2	47	94	0.04	1.67	3.34	10.2	104.04	208.04
50 – 54	0	52	0	0	1.71	0	15.2	231.04	0
55 – 59	1	57	57	0.017	1.75	1.75	20.2	408.04	408.04
Total	25		920	0.693	38.8				1373.96

Rain fall	(f) Number of years	$f(x-\bar{x})$	(C.L) Class boundries)	(c.f) Cumulative Frequency
20 – 24	1	14.8	19.5 – 24.5	1
25 – 29	3	29.4	24.5 – 29.5	4
30 – 34	5	24	29.5 – 34.5	9
35 – 39	8	1.6	34.5 – 39.5	17
40 – 44	5	26	39.5 – 44.5	22
45 – 49	2	20.4	44.5 – 49.5	24
50 – 54	0	0	49.5 – 54.5	24
55 – 59	1	20.2	54.5 – 59.5	25

① $A.M = \dfrac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i} = \dfrac{920}{25}$

$A.M = 36.80$

② $H.M = \dfrac{\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} \left[\dfrac{f_i}{x_i}\right]} = \dfrac{25}{0.693}$

$H.M = 36.08$

③ $G.M = \text{Anti-log}\left[\dfrac{\sum_{i=1}^{n} f_i \log(x_i)}{\sum_{i=1}^{n} f_i}\right]$

$= \text{Anti-log}\left[\dfrac{38.8}{25}\right]$

$= \text{Anti-log}\,(1.55)$

$G.M = 35.48$

(4) Median $= \left(\frac{n}{2}\right)$th

$= \left(\frac{25}{2}\right)$th

$= (12.5)$th, which is lies b/w in the class $34.5 - 39.5$. therefore

$$\text{Median} = l + \frac{h}{f}\left(\frac{n}{2} - cf\right)$$

$$= 34.5 + \frac{5}{8}(12.5 - 9)$$

$$= 34.5 + \frac{5}{8}(3.50)$$

$$= 34.5 + 2.19$$

So, **Median = 36.69**

(5) Range = Height class upper boudries

Range = lowest class lower boundries

$= 59.5 - 19.5$

Raage = 40

(6) Mode $l + \frac{f_m - f_1}{(f_m - f_1) + (f_m - f_2)} \times h$

l = lower class boundries of the modal class

f_m = Frequency of the modal class

f_1 = Fequency Associated with the class following the modal class.

h = width of class Interval

So, the mode, can be

$$\text{Mode} = 34.5 + \frac{(8-5)}{(8-5)+(8-5)} \times 5$$

$$= 34.5 + \frac{3}{3+3} \times 5$$

Mode = 37

Quartiles: The three value which divide the distribution into four equal parts are called the Quartiles.

These value are denoted by Q_1, Q_2 and Q_3, Q_1 is called the Lower quartile and Q_3 are called upper quartile. Q_2 is called Median.

So, we shall calculate Q_1 and Q_3

$$Q_1 = \left(\frac{n}{4}\right)\text{th}$$

$$= \left(\frac{25}{4}\right)\text{th}$$

$$= (6.25)\text{th}, \text{ which associated in the class } (29.5 - 34.5). \text{ Therefore}$$

$$Q_1 = l + \frac{h}{f}\left(\frac{n}{4} - c.f\right)$$

$$= 29.5 + \frac{5}{5}(6.25 - 4)$$

$$= 29.5 + 2.25$$

$$\boxed{Q_1 = 31.75}$$

$Q_3 = \left(\frac{3n}{4}\right)^{Th}$

$= \left(\frac{3 \times 25}{4}\right)^{Th}$

$= (18.75)^{Th}$, which correspounds in the class, $(39.5 - 44.5)$. therefore

$Q_3 = l + \frac{h}{f}\left(\frac{3n}{4} - c.f\right)$

$= 39.5 + \frac{5}{5}(18.75 - 17)$

$= 39.5 + 1.75$

$\boxed{Q_3 = 41.25}$

Deciles : which divide the distribution into ten equal parts, are called deciles. which is denoted by by $D_1, D_2 \cdots D_9$

The calculation of each decile to be calculated is too large and time consuming. So, for the practic, we can calculate D_2

$$D_2 = \left(\frac{2n}{10}\right)^{th}$$

$$= \left(\frac{2 \times 25}{10}\right)^{th}$$

$= 5^{th}$, which correspounds in the class, $(29.5 - 34.5)$. therefore

$$D_2 = l + \frac{h}{f}\left(\frac{2n}{10} - c.f\right)$$

$$= 29.5 + \frac{5}{5}(5 - 4)$$

$$= 29.5 + 1$$

$$\boxed{D_2 = 30.5}$$

Percentile: which is divide the distribution into hundred equal parts are called percentile, which is denoted by

$P_1, P_2 \ldots\ldots P_{99}$

As;

$$P_{30} = \left(\frac{30\,n}{100}\right)\text{Th}$$

$$= \left(\frac{30 \times 25}{100}\right)\text{Th}$$

$= (7.5)$ th, which associated in the class $(29.5-34.5)$. So

$$P_{30} = l + \frac{h}{f}\left(\frac{30n}{100} - c.f\right)$$

$$= 29.5 + \frac{5}{5}(7.5-4)$$

$$= 29.5 + 3.50$$

$$\boxed{P_{30} = 33}$$

(10)

$$M.D = \frac{\sum_{i=1}^{n} f_i |x - \bar{x}|}{\sum_{i=1}^{n} f_i}$$

$$= \frac{136.4}{25}$$

$$M.D = 5.46$$

(11) Variance :=

$$\frac{\sum_{i=1}^{n} f_i (x - \bar{x})^2}{\sum_{i=1}^{n} f_i}$$

$$= \frac{1373.96}{25}$$

Variance = 54.96

(12) Standard Derivation $= \sqrt{\text{Variance}}$

$$= \sqrt{54.96}$$

SD = 7.41

(13) Coefficient of variation (C.V) =

$$\frac{S.D}{\bar{x}} \times 100$$

$$= \frac{7.41}{36.80} \times 100$$

C.V = 20.14

(14) Quartile Deviation $(Q.D) = \frac{Q_3 - Q_1}{2}$

where $Q_3 = 41.25$ and $Q_1 = 31.75$

$$Q.D = \frac{41.25 - 31.75}{2}$$

Q.D = 4.75

(15) Skewness $(Sk) = \frac{\text{mean} - \text{mode}}{S.D}$

where, mean = 36.80, Mode = 37

and S.D = 7.41

$$Sk = \frac{36.80 - 37}{7.41}$$

$$= \frac{-0.20}{7.41}$$

Skewness = −0.03

x	$1/x$	$\log(x)$	$(x-\bar{x})$	$(x-\bar{x})^2$	$\lvert x-\bar{x}\rvert$
22	0.045	1.34	−14.8	219.04	14.8
27	0.037	1.4313	−9.8	96.04	9.8
27	0.037	1.4313	−9.8	96.04	9.8
27	0.037	1.4313	−9.8	96.04	9.8
32	0.0312	1.5051	−4.8	23.04	4.8
32	0.0312	1.5051	−4.8	23.04	4.8
32	0.0312	1.5051	−4.8	23.04	4.8
32	0.0312	1.5051	−4.8	23.04	4.8
32	0.0312	1.5051	−4.8	23.04	4.8
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.5682	0.2	0.04	0.2
37	0.027	1.6232	0.2	0.04	0.2
42	0.0238	1.6232	0.2	27.04	0.2
42	0.0238	1.6232	5.2	27.04	5.2
42	0.0238	1.6232	5.2	27.04	5.2
42	0.0238	1.6232	5.2	27.04	5.2
42	0.0238	1.6232	5.2	27.04	5.2
47	0.0212	1.6720	1.76	3.10	1.76
47	0.0212	1.6720	1.76	3.10	1.76
57	0.019	1.7558	20.2	408.04	20.2
Total	0.73	38.92		1172.12	136.40

① $A.M = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{920}{25}$

$A.M = 36.8$

② $H.M = \frac{n}{\sum_{i=1}^{n} (1/x_i)} = \frac{25}{0.73}$

$H.M = 34.25$

③ $G.M = \text{Anti-log}\left[\sum_{i=1}^{n} \frac{\log(x_i)}{n}\right]$

$= \text{Anti-log}\left[\frac{38.92}{25}\right]$

$= \text{Anti-log}(1.56)$

$G.M = 36.04$

④ Mode: Most repeated value is called mode

So, Mode = 37

(5) Median: is the mid-value of a data set

$$\text{Median} = \left[\left(\frac{n}{2}\right)+1\right] \text{th}$$

$$= \left[\left(\frac{25}{2}+1\right)\right] \text{th}$$

$$= (12+1)\text{th}$$

Median = 13th, integer of a data set

Median = 37

(6) Quartiles:

$$Q_1 = \left[\left(\frac{n}{4}\right)+1\right] \text{th}$$

$$= \left[\left(\frac{25}{4}\right)+1\right] \text{th}$$

$$= (6.25+1)\text{th}$$

$$= (7.25)\text{th}$$

$$= 7\text{th}$$

$$\boxed{Q_1 = 32}$$

$$Q_3 = \left[\left(\frac{3n}{4}\right)+1\right] th$$

$$= \left[\left(\frac{3\times 25}{4}\right)+1\right] th \Rightarrow (19.75)th$$

$$= (20)th, \text{ Integer}$$

$$\boxed{Q_3 = 42}$$

(7) Deciles:

As, $D_2 = \left[\left(\frac{2n}{10}\right)+1\right] th \Rightarrow \left[\left(\frac{2\times 25}{10}+1\right)\right] th$

$= (5+1)th \Rightarrow 6th$, Integer

$$\boxed{D_2 = 32}$$

(8) Percentile %

As, $P_{30} = \left[\left(\frac{30n}{100}\right)+1\right] th$

$= \left[\left(\frac{30\times 25}{100}\right)th\right.$

$= (7.50+1)th \Rightarrow (8.50)th$

$P_{30} = 9th$, Integer

$$\boxed{P_{30} = 32}$$

(9) Range = largest value − smallest value

$R = 57 - 22$

$\boxed{R = 35}$

(10) $Q.D = \frac{Q_3 - Q_1}{2}$

$= \frac{42 - 32}{2}$

$\boxed{Q.D = 5}$

(11) $\text{Skewness} = \frac{\text{Mean} - \text{mode}}{S.D}$

$= \frac{36.8 - 37}{7.41}$

$= \frac{-0.20}{7.41}$

$\text{Skewness} = -0.03$

(12) Coefficient of variation (C.V)

$= \frac{S.D}{\bar{x}} \times 100$

$= \frac{7.41}{36.8} \times 100$

$\boxed{C.V = 20.14}$

(13) Mean Deviation $= \frac{\sum_{i=1}^{n} |x - \bar{x}|}{n}$

$= \frac{136.40}{25}$

$M.D = 5.46$

(14) Variance $= \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n}$

$= \frac{1172.12}{25}$

Variance $= 46.88$

(15) $S.D = \sqrt{\text{Variance}}$

$= \sqrt{46.88}$

$S.D = 6.85$