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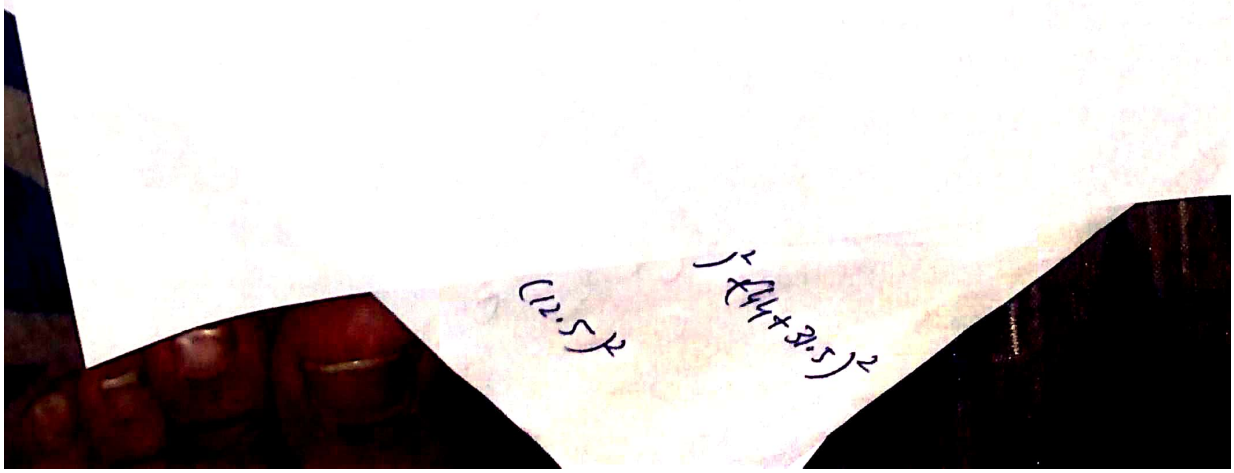
Paper : Stastistic



Q 1.

a)

→ overall mean for men

OVERALL MEANS

- Fresh vegetable {204+259+266+317}/4 = 261.5 grams
- Fruits {31+45+69+105}/4 = 62.5 grams
- Rice {367+337+269+246}/4 = 304.75 grams
- Fish {23+28+31+44}/4 = 31.5 grams
- meat {70+61+69+77}/4 = 69.25 grams

→ OVERALL MEAN FOR WOMEN

overall mean

- Fresh vegatable (178+235+266+304)/4 245.7 gm
- Fruit {98+46+70+121}/4 66.2 grm
- Rice {315+276+243+220}/4 263.5 grm
- Fish {19+21+28+46}/4 28.5 grm
- meat {48+43+54+63}/4 52 grm

Standard deviation

Formula : $\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$

Standered deviation for men

6 Fresh vegetable

Mean is 261.5 So

Put value $\sigma = \sqrt{\frac{(204-261.5)^2+(259-261.5)^2+(266-261.5)^2+(317-261.5)^2}{4}}$

$\sigma = \sqrt{\frac{(-57)^2+(-2.5)^2+(4.5)^2+(55.5)^2}{4}}$

$\sigma = \sqrt{\frac{3306.25)+6.25+20.25+3080.25}{4}}$

$\sigma = \sqrt{\frac{6413}{4}} = \sqrt{1603.25}$

$\sigma = \boxed{40.04}$

mean $= 62.5$

Fruits

$\sigma = \sqrt{\frac{(31-62.5)^2+(45-62.5)^2+169-62.5)^2(105-62.5)^2}{4}}$

$\sigma = \sqrt{(-31.5)^2+(-17.5)^2+(6.5)^2+(420)^2}/4$

$$\sigma = \sqrt{\frac{992.25 + 306.25 + 42.25 + 1806.25}{4}}$$

$$\sigma = \sqrt{3147/4} = \sqrt{786.75}$$

$$= \boxed{28.04}$$

Rice mean = 304.75

put value $\sigma = \sqrt{\frac{(367-304.75)^2 (337-304.75)^2 269-304.75 (246-}{4}$

$$\sigma = \sqrt{\frac{(62.25)^2 + (32.25)^2 (-35.75)^2 + (-58-75)^2}{4}}$$

$$\sigma = \sqrt{\frac{9644.74}{4}} = \sqrt{2411.1}$$

$$\sigma = \boxed{49.1}$$

mean = 31.5

FISH

Put value

$$\sigma = \sqrt{\frac{(23-31.5)^2 + (28-31.5)^2 (31-31.5)^2 + (44+31.5)}{4}}$$

$$\sigma = \sqrt{\frac{(-85)^2 + (-3.5)^2 + (0.5)^2 + (12.5)^2}{4}}$$

$$\sigma = \sqrt{\frac{72.25 + 12.25 + (0.25) + 156.25}{4}}$$

$$\sigma = \sqrt{\frac{241}{4}}$$

$$\sigma = \sqrt{60.25}$$

$$\sigma = \boxed{7.8}$$

MEAT

mean 69.25

Put valeue

$$\sigma = \sqrt{\frac{(70-69.25)^2 + (61-69.25)^2 + (69-69.25)^2 + (77-69.25)^2}{4}}$$

$$\sigma = \sqrt{\frac{(0.75)^2 + (-8.25)^2 + (0.25)^2 + (7.75)^2}{4}}$$

$$\sigma = \sqrt{\frac{0.56 + 68.06 + 0.06 + 60.06}{4}}$$

$$\sigma = \sqrt{\frac{128.74}{4}} = \sqrt{32.2}$$

$$\sigma = \boxed{5.7}$$

Standard deviation (women)

Formula $\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - x_i)^2}$

* Fresh vegetable mean = 245.75

* Put value $\sigma = \frac{(178-245.75)^2+(235-245.75)^2(266-245.75)^2}{4}$ $(304-245.75)^2$

$\sigma = 4590 + 115.6 + 410 + 3393$

$\sigma = \frac{8508.6}{4} = 2127$

$\sigma = 46.1$

Standard deviation of fruit

mean 66.25

put value

$\sigma = \sqrt{28-66.25)+(46-66.25)+(70-66.25)^2+(21-66.25)^2}$

$\sigma = \sqrt{1463 + 410 + 44 + 2997} = \sqrt{\frac{4884}{4}}$

$\sigma = \sqrt{1221} = \sigma\ 34.95$

standard deviation of Rice

mean = 263.5

put value

$$5 = \sqrt{315 - 263.5) + 276 - 263 - 5) + (243 - 263 - 5) + (220 - 263 - 5)^2}$$

$$\frac{4}{}$$

$$\sigma \sqrt{2652.25 + 158.25 + 420.025 + 1892.95}$$

$$\frac{4}{}$$

$$\sigma = \sqrt{\frac{5124}{4}} \qquad = \sqrt{280.2}$$

$$\sigma = \sqrt{71.6}$$

Standard deviation of fish

mean = 28.5

put value

$$\sigma = \sqrt{19.25.5) + \beta 1 - 28.5)^2 + (28 - 285)^2 (46 - 28.5)^2}$$

$$\frac{4}{}$$

$$\sigma \sqrt{-9.5)^2 + (7.5)^2 + (-0.05)^2 + (17.5)^2}$$

$$\sigma = \sqrt{90.25 + 56.25 + 0.25 + 306.25} = \sqrt{\frac{453}{4}}$$

$$\sigma = \sqrt{113.2} \qquad = 10.6$$

standard deviation of mead

mean = 52

put value

$$\sigma = \sqrt{48 - 52)^2 + (43 - 52) + (54 - 52)^2 + (63 - 52)^2}$$

$$\sigma = \sqrt{16 + 81 + 4 + 121} = \frac{222}{4}$$

$$\sigma = \sqrt{55.5} = 7.4$$

★ Part (b) Q1

Ans. Milk, root vegetable and wheat flour are very low for both mean and women in Q_4 and Q_3 but it rises high in Q_2 and Q_1 So there who eat most vegetable consume much more milk root vegetable and wheat flour than those who eat less fresh vegetable

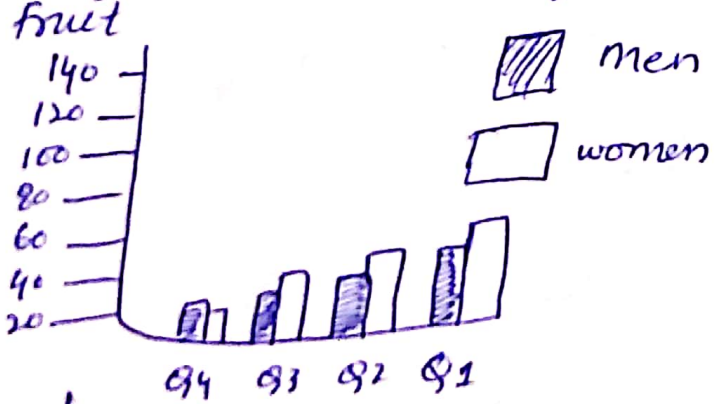
★ PART (C)

Ans. In fruit and fish value of mean Increasing from Q_4 to Q_1 in men and women. But in rice the value of mean decreasing from Q_4 to Q_3

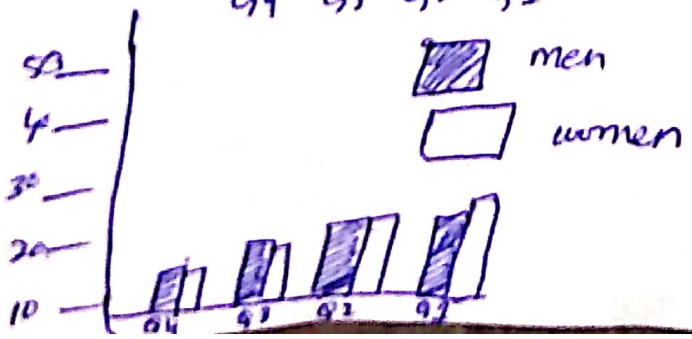
★ Part (D)

Draw a suitable digram

★ For fruit



★ For Fish



PART (F)

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

By Using above formula the value of Standard derivation of men is more then women wheat flour vegetable fruit wheat, flour whole grains

Question No 2 (Part) (B) page 1

PART (A)

Ans:- The purpose of Census is to count the the Entier population of a country and Individuals at location where the actually lives Census count the number of living in the home their age, sex and. it help in the forming and important base for planing policy development and decreasing the number.

* PART (B)

In Census each and every unit of population is studies in the sampling the Census refer to periodic Collection of information about the population from the it is more suetable to use census method if the population compare to Sample servay. Census servay take more time however it is margin for ever in sample Servay while Census servay is more Correct.

* (Part) C

Obiviously not having a full responce rate to the census is problem for the accuracy of Census as Insufficent data will be colleeted to know about population and of following base for planing and policy development

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PART (D)

Ironic Response to the census by the public signify there into word attitude to the servay and their carelessness in the following accurate data questions of these types are invilated with such abuse response.

* PART (E)

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

* PART (F)

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

Question NO - 3

Rain fall

20 – 24	1	22	22	0.046	1.34	1.34	-14.8	219.04	219.04
25 – 29	3	27	81	0.12	1043	4.29	-9.8	96.04	288.12
30 – 34	5	32	160	0.15	150	7.05	9.8	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
			920	0.693	38.8				1373.96

Rain fall	Number of year	$f(x-\bar{x})$	(C.L) Class boundries	(C.F) Cumulative freq
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 $= \dfrac{\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} \left\{\frac{f_i}{x_i}\right\}} = \dfrac{25}{0.693}$

H.M = 36.08

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

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

Anti-log (1.55)

G.M = 35.48

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

$$59.5 - 19.5$$

Range = 40

D Mode $l + \frac{fm - f1}{(fm - f1) + (fm - f2)} \times h$

l = lower class boundries of the model class

fm = frequency of the modal class

f = frequency Associated with the class following the modal class

h = width of class Interval

So, the mode can be

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

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

Mode = 37

(7) Quartiles. There three value which devide the distribution in four equal parts are called Quadriles

These value are denoted by Q_1, Q_2 Q_3 and Q_4 is called the lower quartile, and Questions three are called upper quartile. Q_2 are called median

So, we shall calculate Q_1 & Q_2

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

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

$= (6.25)^{th}$ which associated in the class (29.5 – 34.5) therefore

$$Q_2 = l + \frac{h}{f}\left(\frac{n}{4} - c.f\right)$$

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

$$29.5 + 2.25$$

$$\boxed{Q = 31.75}$$

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

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

$= (18.75)^{th}$ which corresponding in the class $(39.5 - 44.5)$ therefore

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

$$39.5 + \frac{5}{5}(18.75 + 7)$$

$$39.5 + 1.75$$

$$\boxed{Q_3 = 4125}$$

Deciles.

which devide the distribution into ten equal parts are called deciles which is denoted by $D_1, D_2 \text{---} D_9$

The calculation of each decile to be calculated to large and time consuming

So, for the practice, we can calculated

D_2

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

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

$= 5^{th}$ which corespound in the class (29.5 — 34.5) therfore

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

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

$$\boxed{D_2 = 30.5}$$

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

$$P_1, P_2 \text{ ---- } P_{99}$$

As $$P_{30} = \left(\frac{30n}{100}\right)^{th}$$

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

$= (7.5)^{th}$ which associated in the class $(29.5 - 34.5)$ So therefore

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

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

$$29.5 + 3.50$$

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

(10)

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

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

$$MD = 5.46$$

(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 deviation = $\sqrt{\text{variance}}$

$$= \sqrt{54.96}$$

SD = 7.41

(13) Coefficient of variation (10) $C_{cv} = \frac{S.D}{\bar{x}} \times 100$

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

$C.V = 20.14$

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

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

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

$\boxed{Q.D = 4.75}$

(15) Skewness $(Sk) = \frac{mean - mode}{SD}$

where mean $= 36.80$, Mode $= 37$

and $SD = 7.41$

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

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

$\boxed{\text{Skewness} = -0.03}$

X					
22	0.045	1.34	-14.8	219-04	14.8
27	0.037	1.4813	-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	1.5682	0.2	0.04	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
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

PART (B)

(1) $AM = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{920}{25}$

$A.m = 36.8$

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

H.M = 34.25

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

$\text{Anti-log}\left(\frac{38.92}{25}\right)$

Anti − log (1.56)

GM = 36.04

(4) Mode : Most repeated value called mode

So **Mode 37**

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

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

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

median = 13th, Integer of data set

median = 37

(6) Quartile

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

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

$$= (6.25+1)^{th}$$

$$= (7.25)^{th}$$

$$= 7th$$

$Q_1 = 32$

(4)

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

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

$(20)^{th}$ integer

$Q_3 = 42$

(7) Deciles

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

$\boxed{D_2 = 32}$

Percentile

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

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

$(7.50+1)$ 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) $$\text{Skeweness} = \frac{\text{mean} - \text{mode}}{S.D}$$

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

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

Skewness $= -0.03$

(12) Cofficent of variation (C.V)

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

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

$$\boxed{C.V = 20.14}$$

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

$= \frac{136.40}{25}$

M.D $= 5.46$

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

$= \frac{1172.12}{25}$

Variance $= 46.88$

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

$= \sqrt{46.88}$

$$\boxed{S.D = 6.85}$$