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Q.1 The data in the table are given from from a survey of the diet of 1308 men & 1540 women in total 2848 adult in the region in a region of Pakistan. The number of men & women survey were divided ----- The column headed SE give the standard error of the food consumption by all men & womens. -----

Answer of Question 1

Men sample size 1308

	Mean ^{Q4}	Mean ^{Q3}	Mean ^{Q2}	Mean ^{Q1}	S.E
Fresh veg.	204	259	266	317	0.9
Fruit 31		45	69	105	0.5
Rice 367		337	269	246	1
wheat flour 792		114	197	253	1.0
whole grain 792		2	6	27	1.0
Root veg 7		11	16	29	1.0
Meat 70		61	69	77	0.4
Fish 28 23		28	31	44	0.2
Milk 2		3	23	39	0.3
$\Sigma = 78$	812	$\Sigma 812$	$\Sigma 966$	$\Sigma = 1137$	

2: Wom

Mean	\bar{x}_1	\bar{x}_2	\bar{x}_3	S.E
Fresh veg 178	235	266	34	0.8
Fruit 28	46	70	121	0.4
Rice 315	276	243	220	0.8
Wheat Flour 56	118	141	180	0.8
Whole grain 1	3	6	22	0.1
Root veg 6	12	17	28	0.1
Meat 48	43	54	63	0.3
Fish 19	21	28	46	0.2
Milk 1	4	15	48	0.3
$\Sigma: 652$	$\Sigma 758$	$\Sigma 846$	$\Sigma 1032$	

Part A of Q 1

Formula for area

all means

$$\text{Mean} = \frac{\sum \bar{x}_i}{n}$$

$$\text{Mean} = \frac{3748}{36} = 104.11$$

over all Mean for Mean = 104.11

Now finding over all Mean for women

$$\frac{\sum \bar{x}_i}{n}$$

$$= \frac{3282}{36} = 91.16$$

Mean 91.16

over all mean for women = 91.16

and finding combined mean for men and women for fresh veg.

$$\text{Mean} = \frac{\sum X_i}{n} = \frac{5027}{32}$$

Mean 157.09

Combine Mean for Men & women is 157.09

“Part B”

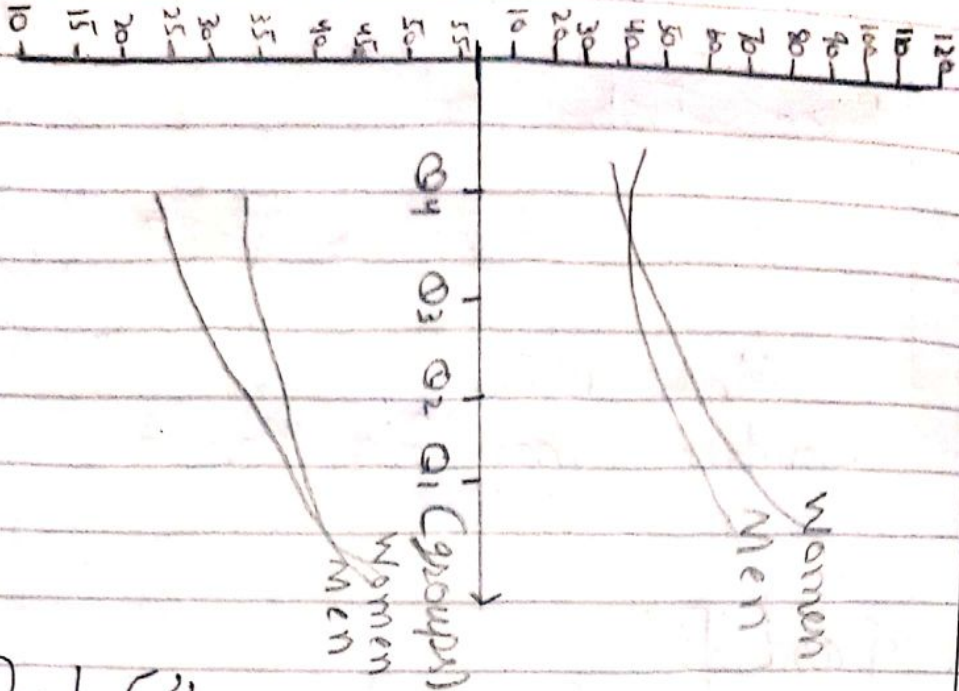
Consumption of milk from both men & women are low in Q3 & Q4 but it is sharply rise in Q1 & Q2.

- Fresh veg. consumption is sharply rise in Q1 & Q2
- Consumption from white flour for both men & women is very low in Q3 & Q4 but it is sharply Q1 & Q2

“Part C”

- Consumption of rice fall for both men & women.
- Consumption for fruits rises for both men & women
- Consumption of fish also fall for both men & women.

"Part D"



"Part E"

Group	Men Q4	Women Q1
Fresh veg.	204	304
Fruits	31	121
Rice	367	202
Wheat flour	79	180
Meat	70	63
Fish	23	48

There are a big difference b/w pateren of consumption.

Men eat more ϕ rice ϕ women eat more fresh veg., fruits, wheat flour ϕ fish

"Part F"

Standard deviation of whole grain ϕ root vegetable for men ϕ women is very less therefore root vegetable ϕ grain whole result is best.

* Question No 3
 a Find A.M, G.M, H.M, Mode, Quartile, Percentile, Range, M.D, Q.D. Variance, standard deviation ----- the following data.

Rain fall (inches)	Name of year
20-24	1
25-29	3
30-34	5
35-39	8
40-44	5
45-49	2
50-54	0
55-59	1

b Convert the above given data in the form of ungrouped & then find A.M, G.M, H.M Median, mode, Quartiles, Deciles, Decantile, Rang M.D, Q.D variance. standard deviation coefficient of variation skewness for the converted data

Solution

Rainfall	Numbers of years
20-25	1
25-29	3
30-34	5

35-39	8
40-44	5
45-49	2
50-54	0
55-59	1

Class	f	x	fx	$f \log x$	f/x	c.f
20-24	1	22	22	1.34	0.045	1
25-29	3	27	81	4.29	0.11	4
30-34	5	32	160	7.52	0.15	9
35-39	8	37	296	12.54	0.21	17
40-44	5	42	210	8.11	0.119	22
45-49	2	47	94	3.34	0.042	24
50-54	0	52	0	0	0	24
55-59	1	57	57	1.75	0.017	25

$$\Sigma = 25 \quad \Sigma = 920 \quad \Sigma = 0.708$$

a, Formula for A.M

$$A.M = \frac{\Sigma fx}{\Sigma f} = \frac{920}{25} = 36.8$$

Now

$$A.M = 36.8 \text{ Ans}$$

Formula for G.M

$$G.M = \text{antilog} \left[\frac{\Sigma f \log x}{\Sigma f} \right]$$

$$= \text{anti log} \left(\frac{38.92}{25} \right)$$

$$G.M = 35.48 \text{ Ans}$$

$$H.M = \frac{\Sigma f}{\Sigma f/x} = \frac{25}{0.708} = 35.31$$

$$H.M = 35.31$$

Class	f_o	median C.B	C.F
20-24	1	19.5-24.5	1
25-29	3	24.5-29.5	4
30-34	5	29.5-34.5	9
35-39	8	34.5-39.5	17
40-44	5	39.5-44.5	22
45-49	2	44.5-49.5	24
50-54	0	49.5-54.5	24
55-59	1	54.5-59.5	25

Formula

$$\text{Median} = l_1 + \frac{n/2 - cf}{f} \times h$$

$$\text{Now } n/2 = \frac{25}{2} = 12.5$$

$$l_1 = 34.5, l_2 = 39.5, h = 5, f = 8, cf = 9$$

Putting value in formula

$$\text{Median} = 34.5 + \frac{12.5 - 9}{8} \times 5$$

$$\text{Median} = 36.68 \text{ Ans}$$

Formula for Mode

$$\text{Mode} = \frac{l_1 + 7f_m - f_2}{2f_m - f_1 - f_2} \times h$$

We see in Modal group

$$l_1 = 34.5, l_2 = 39.5, h = 5, f_m = 8$$

$$f = 5, f_1 = 5$$

Putting the value in formula

8

$$\begin{aligned} \text{Mode} &= 34.5 + \frac{8-5}{2(8)-5-5} \times 5 \\ &= 34.5 + \frac{3}{16-10} \times 5 \\ &= 34.5 + \frac{15}{6} \end{aligned}$$

$$\text{Mode} = 37 \text{ Answer}$$

Formula for Quartile

$$Q_r = l_i + \frac{h}{4} \left(\frac{n+1}{4} \right)$$

$$\text{for } r = 1, 2, 3$$

$$Q_1 = l_1 + \frac{h}{4} \left\{ \left(\frac{n+1}{4} \right) - C.F \right\}$$

$$\frac{n+1}{4} = \frac{\sum f + 1}{4} = \frac{25+1}{4} = \frac{26}{4} = 6.5$$

$$l_1 = 29.5, l_2 = 34.5, h = 5, f = 5, C.F = 4$$

$$Q_1 = 29.5 + \frac{5}{4} (6.5 - 4)$$

$$Q_1 = 29.5 + 1(2.5)$$

$$Q_1 = 32 \text{ Ans}$$

$$Q_1 = 32 \text{ Ans}$$

For Q_2 Now $Q_2 = \text{Median}$

$$\text{Now for } Q_3 = l_i + \frac{h}{4} \left\{ 3 \left(\frac{n+1}{4} \right) - C.F \right\}$$

$$3 \left(\frac{n+1}{4} \right) = 3 \left(\frac{26}{4} \right) = 3 \left(\frac{26}{4} \right)$$

$$= 19.5$$

$$l_1 = 39.5, l_2 = 44.5, h = 5, f = 5$$

$$C.F = 17$$

$$Q_3 = 39.5 + \frac{5}{4} (19.5 - 17)$$

$$Q_3 = 42 \text{ Answer}$$

Formula for Decile

$$D_2 = l_1 + \frac{h}{f} (2n - c.f)$$

For $x=1, 8$

$$D_1 = l_1 + \frac{h}{f} (n - c.f)$$

$$n = \frac{\Sigma f}{10} = \frac{25}{10} = 2.5$$

$l_1 = 24.5, l_2 = 29.5, f = 3, c.f = 1$

$$D_1 = 24.5 + \frac{5}{3} (2.5 - 1)$$

$$D_1 = 27$$

For D_8

$$D_8 = l_1 + \frac{h}{f} (8n - c.f)$$

$$= 8(2.5) = 20$$

$$D_8 = 39.5 + \frac{5}{3} (20 - 17)$$

$$D_8 = 42.5 \text{ Answer}$$

Formula for Percentile

$$P_r = l_1 + \frac{h}{f} (r \cdot n - c.f)$$

$$\text{Now } r \cdot n = \frac{r \cdot \Sigma f}{100}$$

For $r = 1, 2, 3, \dots, 99$

We find P_{15}, P_{54} & P_{89}

$$P_{15} = l_1 + \frac{h}{f} (15n - c.f)$$

$$P_{15} = 24.5 + \frac{5}{3} (3.75 - 1)$$

$$= 24.5 + 2.7$$

$$P_{15} = 27.25 \text{ Answer}$$

Now

$$P_{54} = l_1 + \frac{h}{7} \left(\frac{54n}{100} - C.F \right)$$

$$\text{Now } 54 \left(\frac{25}{100} \right) = 13.5$$

$$P_{54} = 34.5 + \frac{5}{8} (13.5 - 9)$$
$$= 34.5 + 2.8125$$

$$P_{54} = 37.3125$$

For P₈₉

$$P_{89} = l_1 + \frac{h}{7} \left(\frac{89n}{100} - C.F \right)$$

$$89 = 44.5 + \frac{5}{4} (22.25 - 22)$$

$$= 44.5 + 2.5 (0.25)$$

$$P_{89} = 45.125 \text{ Answer}$$

Formula for range

$$\text{Range} = L - S$$

$$\text{Range} = 59 - 20 = 39$$

Formula for Q.D

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

$$Q.D = \frac{42 - 32}{2} = \frac{10}{2} = 5$$

$$Q.D = 5 \text{ Answer}$$

Formula for M.D

$$M.D = \frac{\sum f/x - \bar{x}^2}{\sum f}$$

$$M.D = \frac{136}{25} = 5.44$$

$$M.D = 5.44$$

x	f	$f(x - \bar{x})$	$(x - \bar{x})^2$
12	1	14.8	219.04
27	3	29.4	288.12
31	5	24	115.12
42	8	1.6	0.32
52	5	26	135.2
57	2	20.4	204
37	0	0	0

$\Sigma 136$ $\Sigma = 1685.68$

Formula for variation
 $= \frac{\Sigma f(x - \bar{x})^2}{\Sigma f}$

$= \frac{1685.68}{25} = 67.42$

S.D = $\sqrt{67.42}$

S.D = 8.210 Ans

Now

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

C.V = $\frac{8.210 \times 100}{35.8}$

C.V = 22.30 Ans

Skewness

Formula for SK

$SK = \frac{\text{Mean} - \text{Mode}}{S.D}$

$SK = \frac{36.8 - 37}{8.210}$

$SK = 0.024$

Q3 For Ungrouped data

x	$\log x$	$1/x$	x^2	$(x - \bar{x})$
22	1.34	0.04	22	15.58
27	1.43	0.03	729	10.58
32	1.50	0.031	1024	5.58
37	1.56	0.02	1364	0.58
42	1.62	0.023	1764	4.42
47	1.67	0.021	2209	9.42
52	1.71	0.041	2704	14.42
57	1.75	0.017	329	14.42
$\Sigma = 316$	$\Sigma = 12.6$	$\Sigma = 0.222$		$\Sigma = 307.6$ $\Sigma = 80$

A.M = 39.5

Formula for G.M

$$G.M = \text{anti} (\frac{\Sigma \log x}{n})$$

$$= \text{anti} (\frac{12.6}{8})$$

G.M = 37.58 Ans

Formula for H.M

$$H.M = \frac{n}{\Sigma \frac{1}{x}} = \frac{8}{0.222} = 36.03$$

$$H.M = 36.03$$

Formula for Median

$$\text{Median} (\frac{n}{2})^{\text{th}} = (\frac{8}{2})^{\text{th}} = 4^{\text{th}}$$

Median = 37 Ans

In this case Mode = 0

Formula for Quartile

$$Q_r = \frac{r(n+1)}{4}$$

$r = 1, 2, 3$

For Q₃

$$Q_3 = 3 \left(\frac{n+1}{4} \right) = 3 \left(\frac{8+1}{4} \right) = 3 \frac{9}{4}$$

$$\left(\frac{27}{4} \right)^{\text{th}} = 6.75^{\text{th}}$$

$$Q_3 = 6 + 0.75 (7-6)$$

$$Q_3 = 47 + 0.75 (52-47)$$

$$Q_3 = 47 + 0.75 (5)$$

$$Q_3 = 50.75$$

Formula For Decile

$$D_1 = \frac{r}{1} (n+1)^{\text{th}}$$

$$r = 1,$$

$$6, 9$$

$$D_1 = 0 + 0.9 (1-0)$$

$$D_1 = 0.9 (22)$$

$$= 19.8 \text{ Answer}$$

For D₂

$$D_2 = \frac{6}{10} (n+1) = \frac{6}{10} (8+1) = \frac{9}{10} 6$$

$$= 5.4^{\text{th}}$$

$$D_2 = 5 + 0.4 (6-5)$$

$$D_2 = 42 + 0.4 (47-42)$$

$$D_2 = 44 \text{ Ans}$$

For D₉

$$D_9 = \frac{9}{10} (n+1) = \frac{9}{10} (8+1) = \frac{9(9)}{10}$$

$$8.1 = 8-1^{\text{th}}$$

$$10$$

$$D_9 = 8 + 0.1 (9-8)$$

$$D_9 = 57 + 0.1 (1)$$

$$D_9 = 57.1 \times 57$$

Formula for Percentile

$$D_r = \frac{r}{100} (n+1)^{th}$$

For $r = 1, 2, 3, \dots, 100$

w.w we find $P_3 = P_{45} = P_{75}$

$$P_3 = \frac{3}{100} (n+1) = \frac{3}{100} (8+1) = \frac{27}{100}$$

$$P_3 = 0.27$$

$$\Rightarrow 0 + 0.27(1)$$

$$= 0 + 0.27(22)$$

$$P_3 = 5.94$$

Formula for P_{45}

$$P_{45} = \frac{45}{100} (n+1) = \frac{45}{100} (8+1) = \frac{45}{100} (9)$$

$$= 4.05$$

$$= 4 + 0.5(5-4)$$

$$= 4 + 0.5(\frac{1}{2} - 37)$$

$$P_{45} = 37 + 0.5(5) = 39.5$$

Formula for P_{75}

$$P_{75} = \frac{75}{100} (n+1) = \frac{75}{100} (8+1) = \frac{75}{100} (9)$$

$$= 6.75$$

Now

$$P_{75} = 6 + 0.75(7-6)$$

$$= 47 + 0.75(52-47)$$

$$P_{75} = 47 + 0.75(5)$$

$$P_{75} = 50.75 \text{ Answer}$$

Range = ?

$$L - S \\ = 57 - 22 \\ = 36 \text{ Ans}$$

$$\text{Now Q.D} = \frac{Q_3 - Q_1}{2}$$

$$\text{Q.D} = 11.25 \text{ Ans}$$

Formula for M.D

$$\text{M.D} = \frac{\sum (x - \bar{x})}{n} = \frac{80}{8} = 10$$

$$\text{M.D} = 10 \text{ Ans}$$

Formula for var

$$\text{var} = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n} \right)^2$$

$$= \frac{13070}{8} - \left(\frac{316}{8} \right)^2$$

$$= 1633.75 - (39.5)^2$$

$$= 1633.75 - 1560.25$$

$$= 73.5$$

Now

$$\text{S.D} = \sqrt{73.5}$$

$$\text{S.D} = 8.57$$

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

$$= \frac{8.57}{39.5} \times 100$$

$$\text{C.V} = 21.69$$

Skewness:-

$$SK = \frac{\text{Mean} - \text{Mode}}{S.D}$$

$$39.5 - 0$$

$$8.57$$

$$SK = 39.5$$

$$8.57$$

$$SK = 4.60 \text{ Answer}$$

Answer of Question 2,

"Part A"

The purpose of census is to know the exact figure of population living standard of their people census report helps for policy makers, because felt's needs & budgets allocation totally depend on this

"Part B"

In sample survey only a part of population is selected as approximation of population In census the whole data is under consideration, In census we study each and every element in the population which samples survey & agencies survey their limited sample data collection.

"Part C"

Out of 100% the 94% response rate shows that the online census have never to accuracy

"Part D"

Since Iedis Knight is not in any real sense a selegion thus indications that people do not alivings take census seriously this may therefore cast doubt on the accuracy of their response they give. It may also indicate a contempt for or a distant of government agencies while thus example indicate that not all responses can be taken seriously their may shell be value in asking questions.

"Part E"

The potential problem in conducting the 2021 UK census online is accuracy time & engagement.

In online census there is limitation of accurate data collection from the masses. To overcome this a oath should be take in overcome the time spending on the data collection there must be specified time given for completion.

"Part F"

Whenever we add additional data in over sample size it gives more accurate data & the data become reliable. But incorporating the additional data is not easy to taken for this help of highly expert statistician should be taken.