Q1. ID=13708

a)

⇒ Overall mean for Men.

		overal means
Fresh vegetables	(204+259+266+313)/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.

		overal means
Fresh vegetables	(178+235+268+304)/4	245.7 gram
Fruits	(28+46+70+121)/4	66.2 gram
Rice	(315+276+243+220)/4	263.5 gram
Fish	(19+21+28+46)/4	28.5 gram
Meat	(48+43+54+63)/4	52 gram

Standard deviation

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

Standard deviation For men

Fresh vegetable

Mean is 261.5 so,

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

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

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

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

$\sigma = 40.04$

Fruits

Mean = 62.5

put value $\sigma = \sqrt{\frac{(31-62.5)^2+(45-62.5)^2+(69-62.5)^2+(105-62.5)^2}{4}}$

$\sigma = \sqrt{(-31.5)^2 + (-17.5)^2 + (6.5)^2 + (42.5)^2/4}$

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

$\sigma = \sqrt{3147/4} = \sqrt{786.75} = 28.04$

(7) Number of years	(x) mid-points	7x	7/x	log(x)	7 log(x)
1	~~22~~ 22	22	0.046	1.34	1.34
3	~~27~~ 27	81	0.12	1.43	4.29
5	32	160	0.15	1.50	7.5
8	37	296	0.21	1.56	12.48
5	42	210	0.11	1.62	8.1
2	47	94	0.04	1.67	3.34
0	52	0	0	1.71	0
1	57	57	0.017	1.75	1.75

And value of of standard deviation is same for both men and women in remaining catagories.

Q1 (e)

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

Q2 (a) Purpose of census:

Ans Census is a survey conducted the whole set of observation object which is belonging to population.

The purpose of census is count the entire population or every object in given observation. In census ask every type

of an error. of may increase error further.

(d)

Ans In the census about + asking a specific religion or group may cause of harsh behavior or many mishappen. It is possible that someone do not like to answer of these kind of questions.

(e)

There is a lot of Potential Problem in conducting the 2021 UK census. online, the fist and main issue is that the availability of online conection

behaviour.

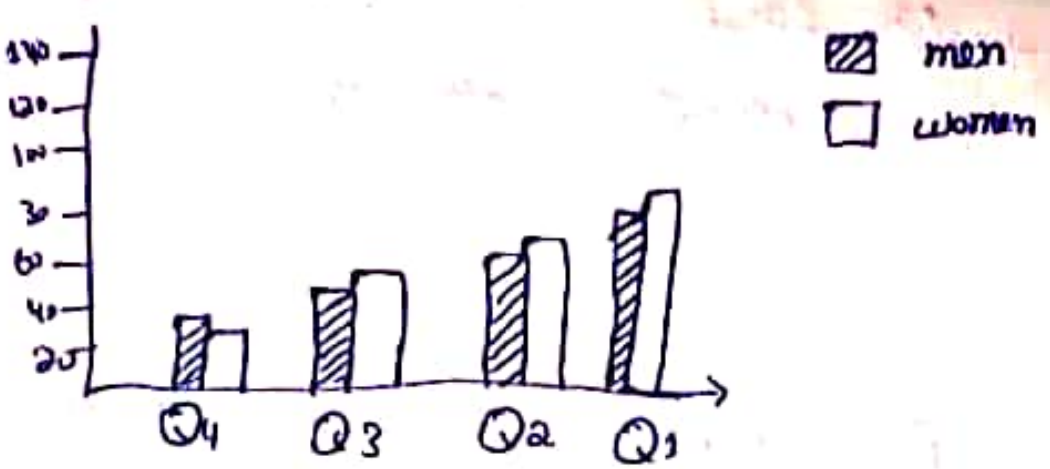
The only way to overcome this Problem to giving the connection to the whole country and make sure and punctual to every Person to give the response.

(F)

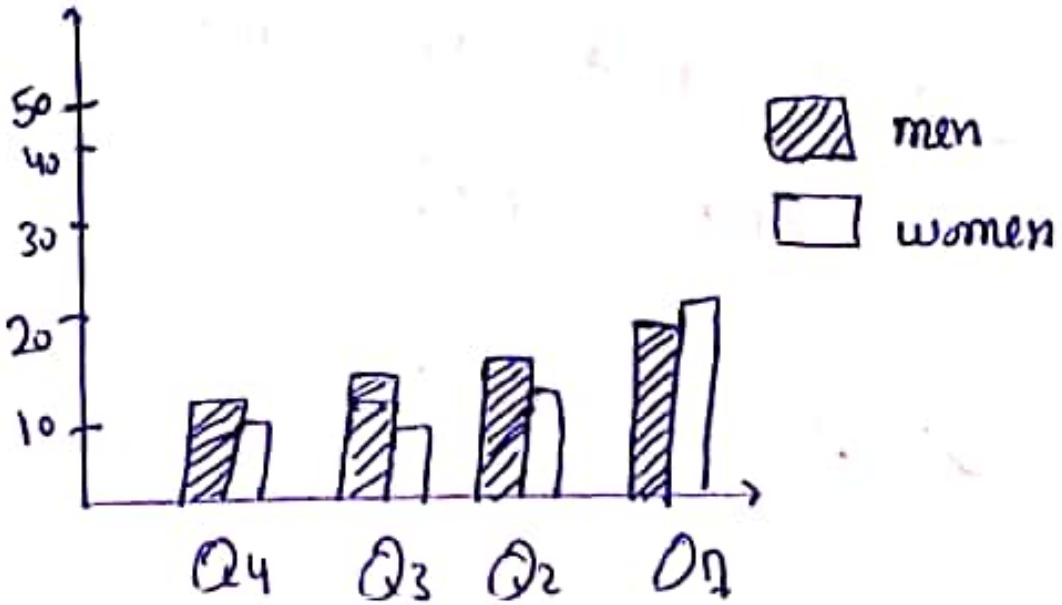
Ans Census, itself mean the study of every object under the observation.

(d) Draw a suitable diagram.

For Fruits



For Fish :-



(f)

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

By using above formula the value of standard deviation of men in more than women whe

but it rises high in Q2 and Q3 so those who eat mail vegalable consume mush more milk soot vegetable and wheat flour than those who eats less fresh vegetible.

(c)

In fruit and fish the value of mean increasing from Q4 to Q2 in men and women. But in Rice the value of mean decreasing from Q4 to Q1.

Q2 (b) Differ from sample survey.

Ans In sample survey we go through some selected part from the population. our consern about information is totally based upon the selected data. The some procedure done by Goovement agencies, they get the data by picking some selected part of population But in census it is compulsory to go through from every object of population that is why census is debtess from sample survey.

(c)

Ans From the given information 2011 uk census attracted a response rate of 94% which is good. But it can rise any

Rainfall	(f) Number of years	$f\|x-\bar{x}\|$	(C.L) Class boundries
20 – 24	1	14.8	19.5 – 24.5
25 – 29	3	29.4	24.5 – 29.5
30 – 34	5	24	29.5 – 34.5
35 – 39	8	1.6	34.5 – 39.5
40 – 44	5	26	39.5 – 44.5
45 – 49	2	20.4	44.5 – 49.5
50 – 54	0	0	49.5 – 54.5
55 – 59	1	20.2	54.5 – 59.5
Total	25	136.4	

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

$\boxed{A.M = 36.80}$

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

$\boxed{H.M = 36.08}$

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

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

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

$\boxed{G.M = 35.48}$

(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 boundries − Lowest class lower boundries

$= 59.5 - 19.5$

Range = 40

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

l = lower class boundries of the modal class

f_m = Frequency of the modal class

f_1 = Frequency associated with the class preceding the modal class.

f_2 = Frequency 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

⑦ 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.

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

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

$= (6.25)^{th}$, which associated in the class $(29.5 - 34.5)$. 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 corresponds in th class, $(39.5 - 44.5)$. Therefore

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

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

$$= 39.5 + 1.75$$

$$\boxed{Q_3 = 41.25}$$

(8) Deciles : which divide 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 is too large and time consuming. So, for the practice, we can calculate

D_2.

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

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

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

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

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

$$= 29.5 + 1$$

$$\boxed{D_2 = 30.5}$$

Q1

(a) → For men overall mean consumption of Fresh Vegetables

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

$$= 236.5$$

→ Mean of Fruits

$$\text{Mean} = \frac{31 + 45 + 69 + 105}{4} = 62.5$$

→ Mean of Rice:

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

$$= 304.75$$

→ Mean of fish

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

$$= 31.5$$

→ Mean of meat.

$$\bar{x} = \frac{70 + 61 + 69 + 77}{4}$$

$$= 69.25$$

→ For women

mean of fresh vegetables

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

⑨ Percentile: which divide the distribution into hundred equal parts are called percentile, which is denoted by

P_1, P_2 ——————— 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

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

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

$$= 29.5 + 3.50$$

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

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

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

$$\boxed{M.D = 5.46}$$

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

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

$$\boxed{\text{Variance} = 54.96}$$

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

$$= \sqrt{54.96}$$

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

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

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

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

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

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

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

$$\boxed{Q.D = 4.75}$$

(15) Skewness (SK) = $\frac{\text{Mean} - \text{Mode}}{S.D}$

where, Mean = 36.80 , Mode = 37

and S.D = 7.41

x | 1/x | ..... |

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

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

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	1.5682	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

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

$\boxed{A.M = 36.8}$

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

$\boxed{H.M = 34.25}$

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

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

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

$\boxed{G.M = 36.04}$

(4) Mode : Most repeated value is called Mode :

So,

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

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

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

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

$$= (12+1)^{th}$$

Median = 13^{th}, Integer } a data set

Median = 37

(6) Quartiles :

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

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

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

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

$$= 7^{th}$$

$Q_1 = 32$

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

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

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

$$\boxed{Q_3 = 42}$$

⑦ Deciles:

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

$$= (5+1)^{th} \Rightarrow 6^{th}, \text{ Integer}$$

$$\boxed{D_2 = 32}$$

⑧ percentile:

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

$$\Rightarrow = \left[\left(\frac{30\times 25}{100}\right)+1\right]^{th}$$

$$= (7.50+1)^{th} \Rightarrow (8.50)^{th}$$

$P_{30} = 9^{th}$, Integer

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

(9) Range = Largest value − Smallest value

= 57 − 22

$$R = 35$$

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

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

$$Q.D = 5$$

(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) =

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

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

$$C.V = 20.14$$

(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) $S.D = \sqrt{Var}$

$= \sqrt{46.88}$

S.D = 6.85