

Name M. Saeed

ID 13910

Programme BS. DT

Pepar Bio-statistic

Techear Sir Anwar Shamim

Q No 1:

(A) To calculate the overall mean consumption of fresh vegetables, fruits, rice, fish, and meat for men  
 fresh veg  $\Rightarrow 204 + 259 + 266 + 317 = 1046$

$$\text{Fruits} \Rightarrow 31 + 45 + 69 + 105 = 250$$

$$\text{Rice} \Rightarrow 367 + 337 + 269 + 246 = 1219$$

$$\text{Fish} \Rightarrow 23 + 28 + 31 + 44 = 126$$

$$\text{Meat} \Rightarrow 70 + 61 + 69 + 77 = 277$$

Now to add the overall mean consumption overall mean consumption =  
 $1046 + 250 + 1219 + 126 + 277$

**(Overall mean consumption = 2918 Ans)**

Now to calculate the overall mean consumption of fresh vegetables, fruits, rice, fish and meat for women.

$$\text{Fresh veg} \Rightarrow 178 + 235 + 266 + 304 = 983$$

$$\text{Fruits} \Rightarrow 28 + 46 + 70 + 121 = 265$$

$$\text{Rice} \Rightarrow 315 + 276 + 243 + 220 = 1054$$

$$\text{Fish} \Rightarrow 19 + 21 + 28 + 46 = 114$$

$$\text{Meat} \Rightarrow 48 + 43 + 54 + 63 = 208$$

Now to calculate the overall mean Consumption.

$$\text{overall mean Consumption} = 983 + 265 + 1054 + 114 + 208.$$

$$\text{overall mean Consumption} = 2624 \text{ Ans}$$

To give underlying standard deviation.

SE column for man.

$$\text{SE } 0.9, 0.5, 1.0, 0.2, 0.4$$

Now SE For women

$$\text{SE} = 0.8, 0.4, 0.8, 0.2, 0.3$$

As from result standard deviation for women is more convenient than man.

Now to calculate overall mean Consumption of fresh-vegetable, rice, fish, and meat for men and women Combined.

Combined Consumption  $\Rightarrow$

$$\text{Fresh veg: } 1043 + 983 = 2026.$$

$$\text{Rice } \Rightarrow 1219 + 1054 = 2273$$

$$\text{Fish } \Rightarrow 277 + 208 = 485$$

$$\text{Combined mean Consumption} = 2026 + 2273 + 240 + 485$$

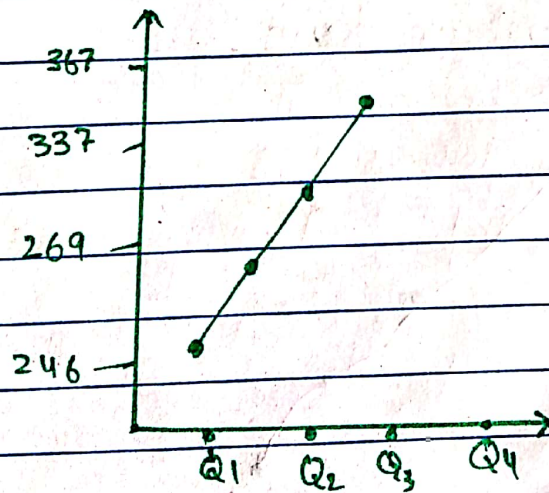
$$\text{Combined mean Consumption} = 5024$$

(B) The figures for milk, root vegetable wheat flour consumption gives us that wheat flour is more necessary for our diet as compare to milk and root vegetable.

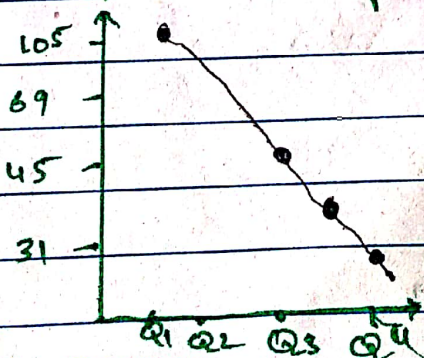
Because from the table of survey at Q<sub>4</sub> column the consumption of milks and root vegetables are 2, 7.

So root vegetables are 2, 7  
So 79 >> 2 and 79 >> 7

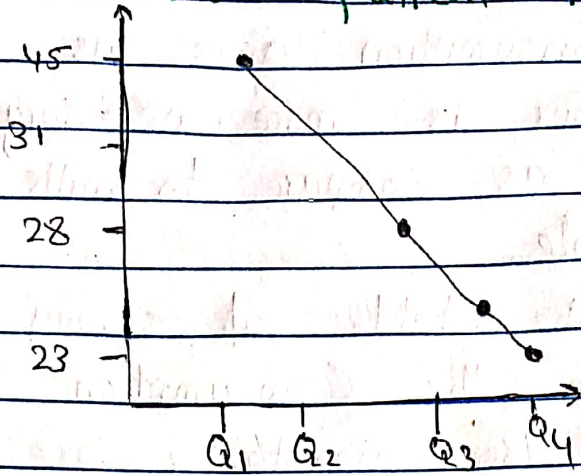
(C) For more pattern Rice



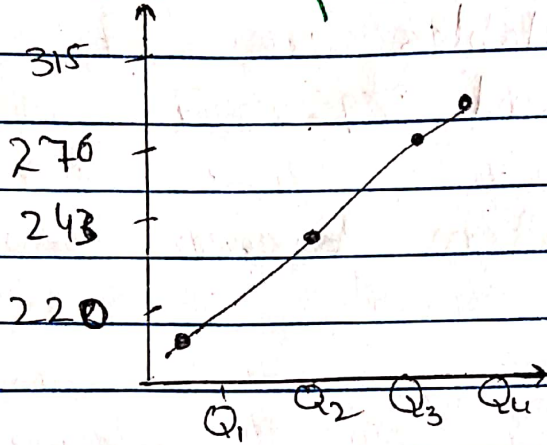
For more pattern fruit



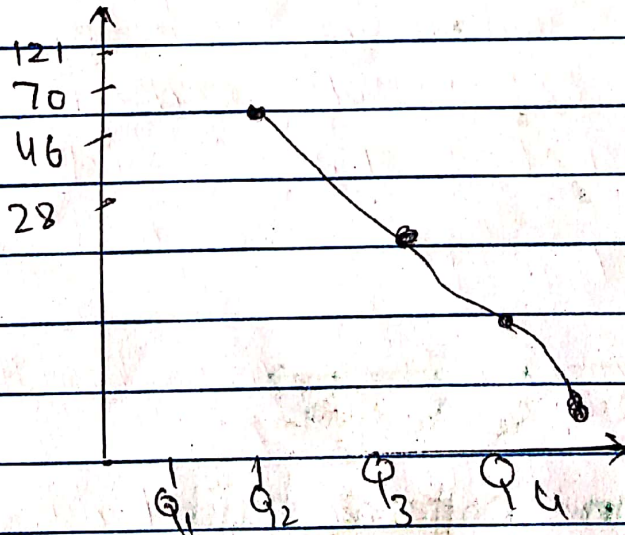
### For man pattern Fish



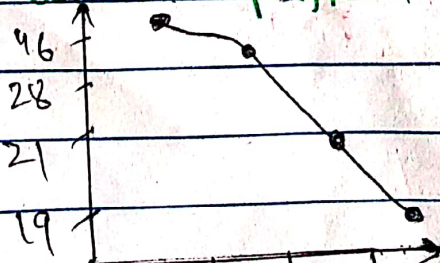
### For women pattern Rice



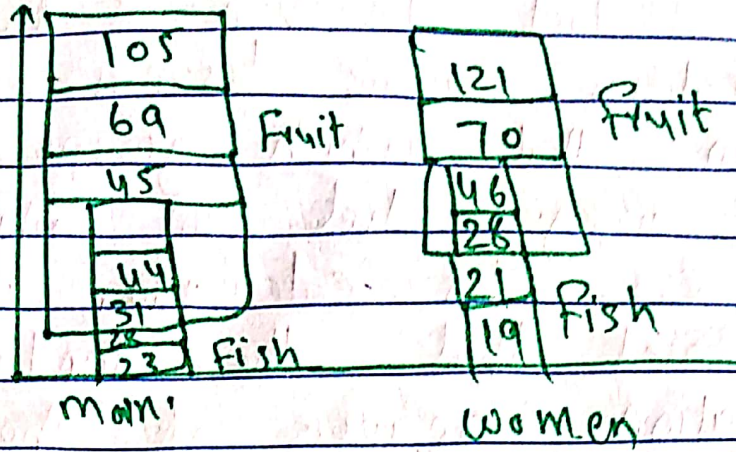
### For women pattern fruit.



### For women pattern Fish



D



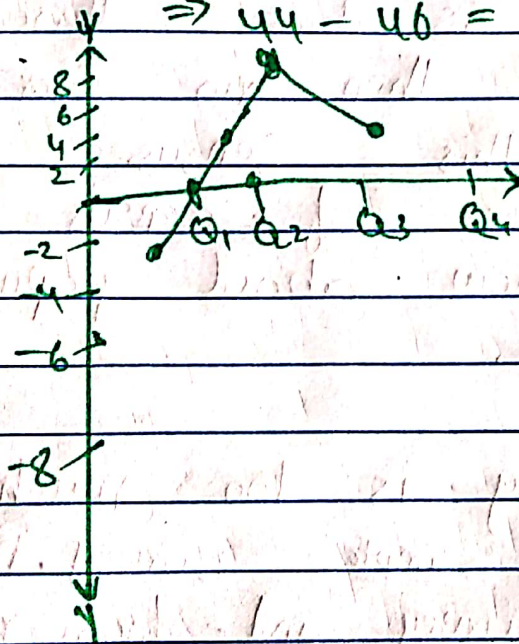
To show the difference b/w man and woman

Fish  $\Rightarrow 23 - 19 = 4$

$\Rightarrow 28 - 21 = 7$

$\Rightarrow 31 - 28 = 3$

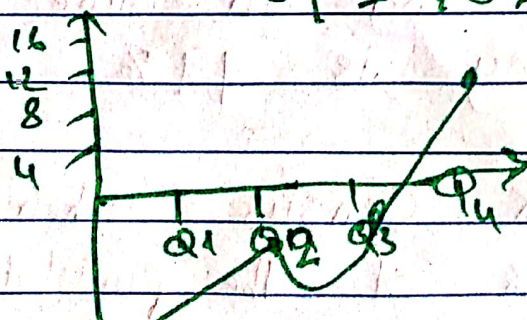
$\Rightarrow 44 - 46 = -2$



Fruit  $\Rightarrow 31 - 28 = 3$

$45 - 46 = -1$

$69 - 70 = -1$



(F) The standard deviation of the given commodities shows for men and woman that which groups consume the average diet on which rate. So after calculation we calculated that the standard deviation answers of the female group is too much small, so female shows better result.

### Question No 2

(A) The purpose of census is that when census is done through online service then no error should occur on this census. another purpose of census is that to know about population of the UK.

(B) Online survey is too much differ from sample survey. Because in sample survey and from routine collection of data by government the chances error is more than online survey and on online survey the accuracy is 99%.

(C) In 2011 UK census when response rate is 94% of the population

and yes that is a problem for the accuracy of the census.

D When 17 000 people stated their religion as "Jedi Knight" then response of the members are not good and attitude of the public to the census. The responses of this type invalid asking question are not good, because people hate this types of questions.

C Internet availability is the potential problem of census conducting in 2021, because internet is not available at anypoint to complete the census, and this problem might be overcome when internet provide to the people of UK.

(F) The main potential problem in incorporating additional data held by govt agencies not provide data by time on which it was required.



(2) 110 3

Rainfall	x	f	fx
20-24	22	1	22
25-29	27	3	81
30-34	32	5	160
35-39	37	8	296
40-44	42	5	210
45-49	47	2	94
50-54	57	0	0
55-59	57	1	57
...	...	25	$\Sigma fx = 920$

$$A.M = \frac{\Sigma fx}{n}$$

$$A.M = \frac{920}{25}$$

$$A.M = 36.8 \quad \text{ANS.}$$

Rainfall	$x_i$	$f_i$	$\log x_i$	$f_i \log x_i$
20-24	22	1	1.341	1.341
25-29	27	3	1.431	4.293
30-34	32	5	1.505	7.525
35-39	37	8	1.568	12.544
40-44	42	5	1.621	8.105
45-49	47	2	1.673	3.346
50-54	52	0	1.718	0
55-59	57	1	1.755	1.755
$\Sigma$	25			$\Sigma f_i \log x_i = 38.8$

$$\log G = \frac{1}{n} \Sigma f_i \log x_i$$

$$\log G = \frac{38.8}{25}$$

$$\log G = 1.552 \text{ ANS.}$$

R. fall	$x_i$	$f_i$	$f_i/x_i$
20-24	22	1	0.045
25-29	27	3	0.11
30-34	32	5	0.15
35-39	37	8	0.21
40-44	42	5	0.11
45-49	47	2	0.04
50-54	52	0	0.00
55-59	57	1	0.01
$\Sigma$	25		$\Sigma \frac{f_i}{x_i} = 0.67$

Checked By: ..... Parents: ..... Excellent  Good  Need Improvement

$$H = \frac{n}{\sum \frac{f_i}{x_i}}$$

$$H = \frac{25}{0.67}$$

$$H.M = 37.31 \quad \text{ANS}$$

To Find Median:

C.B	$x_i$	$f$	C.f
19.5 - 24.5	22	1	1
24.5 - 29.5	27	3	4
29.5 - 34.5	32	5	9
34.5 → 39.5	37	8	17
39.5 → 44.5	42	5	22
44.5 - 49.5	47	2	24
49.5 - 54.5	52	0	24
54.5 - 59	57	1	25

Median

Rainfall ( $\frac{n}{2}$ ) inches

$$M = \frac{25}{2} = M = 12.5 \text{ inches}$$

which corresponds to the class

$$34.5 - 39.5$$

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

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

$$\text{Median} = 34.5 + 0.625 \times 3.5$$

$$\text{Median} = 34.5 + 0.625 \times 3.5$$

$$\text{Median} = 34.5 + 2.18$$

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

To find Mode:

C.B	$x_i$	$f$	$c.f$
19.5 - 24.5	22	1	1
24.5 - 29.5	27	3	4
29.5 - 34.5	32	5	9
34.5 - 39.5	37	8	17
39.5 - 44.5	42	5	22
44.5 - 49.5	47	2	24
49.5 - 54.5	52	0	24
54.5 - 59.5	57	1	25

Σ

(12)

$$\text{Mode} = 1 + \frac{f_m - f_1}{(f_m - f_1) + (f_m - f_2)} \times h$$

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

$$\text{Mode} =$$

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

$$\begin{aligned} \text{Mode} &= 34.5 + 0.5 \times 5 \\ &= 34.5 + 2.5 \end{aligned}$$

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

To find Quartiles.

$$Q_1 = \frac{1(n+1)}{4} = \frac{25+1}{4} = \frac{26}{4} = 6.5 \rightarrow \boxed{32} \text{ ANS.}$$

$$Q_2 = \frac{2(n+1)}{4} = \frac{2(25+1)}{4} = \frac{2 \times 26}{4}$$

$$\frac{26}{2} = Q_2 = 13 \rightarrow \boxed{37} \text{ ANS.}$$

$$Q_3 = \frac{3(n+1)}{4} = \frac{3 \times 25+1}{4} = \frac{3 \times 26}{4}$$

$$Q_3 = \frac{78}{4} = 19.5 \rightarrow \boxed{42} \text{ ANS.}$$

## To Find Variance

Rainfall	$X_i$	$f_i$	$m_i - \bar{n}$	$(m_i - \bar{n})^2$	$f_i(m_i - \bar{n})^2$
20-24	22	1	-14.8	219.04	219.04
25-29	27	3	-9.8	96.04	288.12
30-34	32	5	-4.8	23.04	115.2
35-39	37	8	0.2	0.04	0.32
40-44	42	5	5.2	27.04	135.2
45-49	47	2	10.2	104.04	208.08
50-54	52	0	15.2	231.04	0.00
55-59	57	1	20.2	408.04	408.04
$\Sigma$	= 25	=	=	=	$\Sigma f_i(m_i - \bar{n})^2 = 1374$

$$S^2 = \frac{\Sigma f_i (m_i - \bar{n})^2}{n}$$

$$S^2 = \frac{1374}{25}$$

$$(S^2 = 54.96 \text{ Ans})$$

Now to find Standard deviation  
 $\Rightarrow$  The Square root of variance  
 is called standard deviation.

So  $S^2 = 54.96$   
 Taking square root on both sides

$$\sqrt{S^2} = \sqrt{54.96} \quad (S = 7.41 \text{ As})$$

To Find Q.D

As we know that,

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

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

$$Q.D = \frac{10}{2}$$

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

To Find mean deviation (M.D)

Rainfall	$x_i$	$f_i$	$ x_i - \bar{x} $	$f_i  x_i - \bar{x} $
20-24	22	1	14.8	14.8
25-29	27	3	9.8	29.4
30-34	32	5	4.8	24
35-39	37	8	0.2	1.6
40-44	42	5	5.2	26
45-49	47	2	10.2	20.4
50-54	52	0	15.2	0.0
55-59	57	1	20.2	20.2
$\Sigma$	-	25	-	$\Sigma f_i  x_i - \bar{x}  = 136.4$

$$M.D = \frac{\Sigma f_i |x_i - \bar{x}|}{n}$$

$$M.D = \frac{136.4}{25}$$

$$(M.D = 5.45) \text{ Ans}$$

To find Co-efficient of variation

As we know that

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

$$C.V = \frac{7.41}{36.8} \times 100$$

$$(C.V = 20.13\% \text{ Ans})$$

To Find Skewness

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

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

$$SK = -0.2$$

$$(SK = -0.02) \text{ Ans}$$

To find Range

$$R = X_m - X_0$$

$$R = 59.5 - 19.5$$

$$(R = 40 \text{ Ans})$$



To Final Decile

The divided the data to 10

equal parts

$$D = 1 \left( \frac{N+1}{10} \right)^{\text{th}}$$

$$D_1 = 1 \left( \frac{25+1}{10} \right)^{\text{th}}$$

$$D = \frac{26}{10} = D = \boxed{6.5} \text{ Ans}$$

$$D_2 = 2 \left( \frac{N+1}{10} \right)^{\text{th}}$$

$$D_2 = 2 \left( \frac{25+1}{10} \right)^{\text{th}}$$

$$D_2 = \frac{26}{5}$$

$$D_2 = \boxed{5.2} \text{ Ans}$$

$$D_3 = 3 \left( \frac{N+1}{10} \right)^{\text{th}}$$

$$D_3 = 3 \left( \frac{25+1}{10} \right)^{\text{th}}$$

$$D_3 = \frac{3 \times 26}{10}$$

$$D_3 = \frac{3 \times 26}{10}$$

$$D_3 = \frac{78}{10}$$

$$D_3 = \boxed{7.8} \text{ Ans}$$

(17)

To Find Percentile:

The divided the data to 100 equal parts.

formula:  $P_i = \frac{i(N+1)}{100}$

$$P_i = \frac{25+1}{100}$$

$$P_i = \frac{26}{100}$$

$P_i = 0.26$  ANS-

$$P_{10} = \frac{10 \times N + 1}{100}$$

$$P_{10} = \frac{10 \times (25+1)}{100}$$

$$P_{10} = \frac{10 \times 26}{100}$$

$$P_{10} = \frac{260}{100}$$

$P_{10} = 2.6$  ANS-

$$P_{20} = \frac{20 \times N + 1}{100} = P_{20} = \frac{20 \times 25 + 1}{100}$$

$$P_{20} = \frac{20 \times 26}{100} = P_{20} = \frac{520}{100} = P_{20} = 5.2$$

34.5 = Median  
N = 34.5 + 1

$D = \frac{10 \times 10}{10}$

# To Find ARITHMETIC MEAN:

$$\Rightarrow A.M = \frac{\sum x}{n}$$

$$A.M = \frac{920}{25}$$

$$A.M = \boxed{36.8 \text{ inches}} \text{ ANS.}$$

# GEOMETRIC MEAN:

$$G.M = \text{Antilog} \left[ \frac{\sum \log x}{n} \right]$$

$$G.M = \text{Antilog} \left[ \frac{38.9241}{25} \right]$$

$$\text{Antilog} (1.5569)$$

$$G.M = \boxed{36.05 \text{ inches}} \text{ ANS.}$$

# Harmonic MEAN:

$$H.M = \frac{n}{\sum \frac{1}{x}}$$

$$H.M = \frac{25}{0.7081}$$

$$H.M = \boxed{35.30 \text{ inches}} \text{ ANS.}$$

~~(24)~~  
MEDIAN: (19)

$$\text{Median} = \frac{(n+1)}{2}$$

$$n = 25$$

$$= \frac{25+1}{2} = \frac{26}{2}$$

$$\text{Median} = 13$$

$$= 13 + 25 = \boxed{37} \text{ ANS.}$$

MODE:

Most repeated value 37

$$\text{Mode} = 37$$

Quartiles:

$$Q_1 = \frac{(n+1)}{4}$$

$$Q_1 = \frac{25+1}{4} = Q_1 = \frac{25+1}{4} = Q_1 = \frac{26}{4}$$

$$Q_1 = 6.5$$

$$Q_1 = 6^{\text{th}} + 0.5 (\text{term} - 6^{\text{th}} \text{ term})$$

$$= 32 + 0.5 (32 - 32) = 32 + 0$$

$$\boxed{Q_1 = 32 \text{ inches}}$$