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Allied health science
BS - Dental

Paper

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Statistic

Submitted to

to

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Ans No 012

PART (A)

A)

Overall Mean for Men

⇒ 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	$(70 + 61 + 69 + 77)$	= 69.25 grams

⇒ Overall ^{all} Mean for women.

		Overall Mean
⇒ Fresh vegetable	$(178 + 235 + 266 + 304) / 4$	245.7 grams.
⇒ Fruits	$(28 + 46 + 70 + 121) / 4$	66.2 grams.
⇒ Rice	$(315 + 276 + 243 + 220) / 4$	263.5 grams
⇒ Fish	$(19 + 21 + 28 + 46) / 4$	28.5 grams
⇒ Meat	$(48 + 43 + 54 + 63) / 4$	52 grams.

Standard deviation :-

Formula

$$\sigma = \sqrt{\frac{1}{N} \sum (x_i - \bar{x})^2}$$

Standard deviation for Men

Fresh vegetable

Mean is 261.5 So

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

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

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

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

$$\sigma = \boxed{40.04}$$

Fruits :

Mean = 62.5

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

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

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

$$\sigma = \sqrt{\frac{3147}{4}} = \sqrt{786.75} = \boxed{28.04}$$

Rice Mean = 304.75

Put value
$$\sigma = \sqrt{\frac{(367 - 304.75)^2 + (337 - 304.75)^2 + (209 - 304.75)^2 + (246 - 304.75)^2}{4}}$$

$$\sigma = \sqrt{\frac{(62.25)^2 + (32.25)^2 + (-35.75)^2 + (-58.75)^2}{4}}$$

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

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

Fish \hookrightarrow Mean = 31.5

Put value \hookrightarrow

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

$$\sigma = \sqrt{\frac{(-8.5)^2 + (-3.5)^2 + (-0.5)^2 + (12.5)^2}{4}}$$

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

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

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

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

Meat \hookrightarrow

Mean value = 69.25

Put value:-

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

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

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

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

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

⇒ Standard deviation (women)

$$\text{SD Formula } d = \sqrt{\frac{1}{N} \sum_{i=1}^N (X_i - \mu)^2}$$

∴ Standard deviation of
fresh vegetables

$$\text{Mean} = 245.75$$

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

$$\sigma = \sqrt{\frac{4590 + 115.6 + 410 + 3393}{4}}$$

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

$$\sigma = \boxed{46.1}$$

⇒ Standard deviation of fruits :-

$$\text{Mean} = 66.25$$

$$\text{Put value } \sigma = \sqrt{\frac{(28-66.25)^2 + (46-66.25)^2 + (121-66.25)^2}{4}}$$

$$\sigma = \sqrt{\frac{1463 + 410 + 14 + 2997}{4}} = \sqrt{\frac{4884}{4}}$$

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

∴ Standard deviation of Rice

$$\text{Mean} = 263.5$$

put value

$$\sigma = \sqrt{\frac{(315-263.5)^2 + (276-263.5)^2 + (243-263.5)^2 + (220-263.5)^2}{4}}$$

$$\sigma = \sqrt{\frac{2652.25 + 156.25 + 420.25 + 1892.25}{4}}$$

$$\sigma = \sqrt{\frac{5121}{4}} = \sqrt{1280.25}$$

$$\sigma = \boxed{35.78}$$

∴ Standard deviation of Fish

Mean = 28.5

Put value $\sigma = \sqrt{\frac{(19-28.5)^2 + (21-28.5)^2 + (28-28.5)^2 + (46-28.5)^2}{4}}$

$$\sigma = \sqrt{\frac{(-9.5)^2 + (-7.5)^2 + (-0.5)^2 + (17.5)^2}{4}}$$

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

$$\sigma = \sqrt{113.25} = \boxed{10.6}$$

∴ Standard deviation of Meat :-

Mean = 52

Put value $\sigma = \sqrt{\frac{(48-52)^2 + (43-52)^2 + (54-52)^2 + (63-52)^2}{4}}$

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

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

B) (Q No 1)

Milk:-

The ^{data} given in the chart indicates that the intake of milk is very less for both gender.

Root vegetable:-

The root vegetable is also intake in very less amount for both genders, although men consumption is greater than women.

Wheat flour:-

The consumption of wheat flour is also below average. Milk, wheat flour, root vegetable these three nutrients is very necessary to take women and as well to men.

Rice:-

The Mean Consumption of Men is 304 grams while the women is 263 grams which indicates that men consumption is higher than women.

Fruit:-

The Mean of Men is 62.5 grams while the mean consumption of women is 66.25 grams. It indicates the women consumption is little much more than men.

Fish:-

The Men Consumption for men is 31.5 grams while for women is 28.5 grams, indicates the consumption of men is the more than women, that's why men have more stronger immune system than women.

Q No 9

E) In fresh vegetable Q₁ Women are more than Q₄ men. each Women consumed 78 grams while men consumed 62 grams.

Q No 1

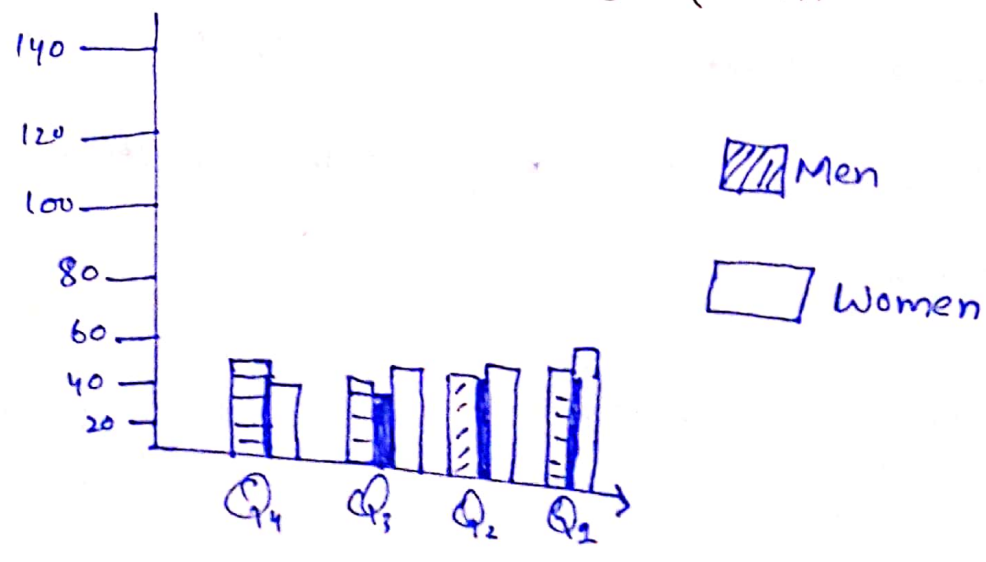
F) In fruit men standard deviation is less than women. In rice standard deviation for women is greater than men.

In fish and meat standard deviation for women is greater than men.

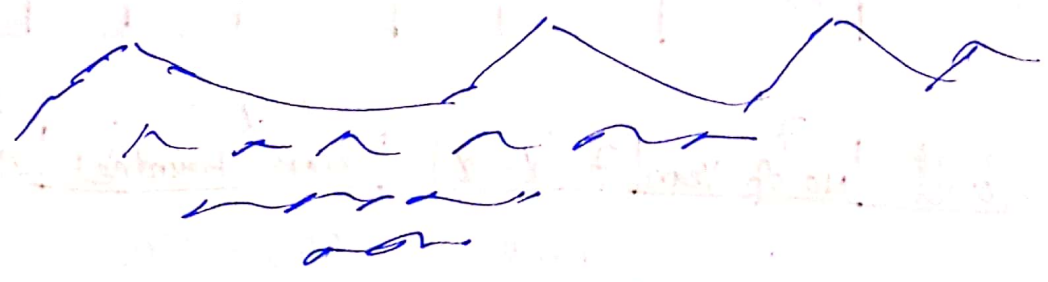
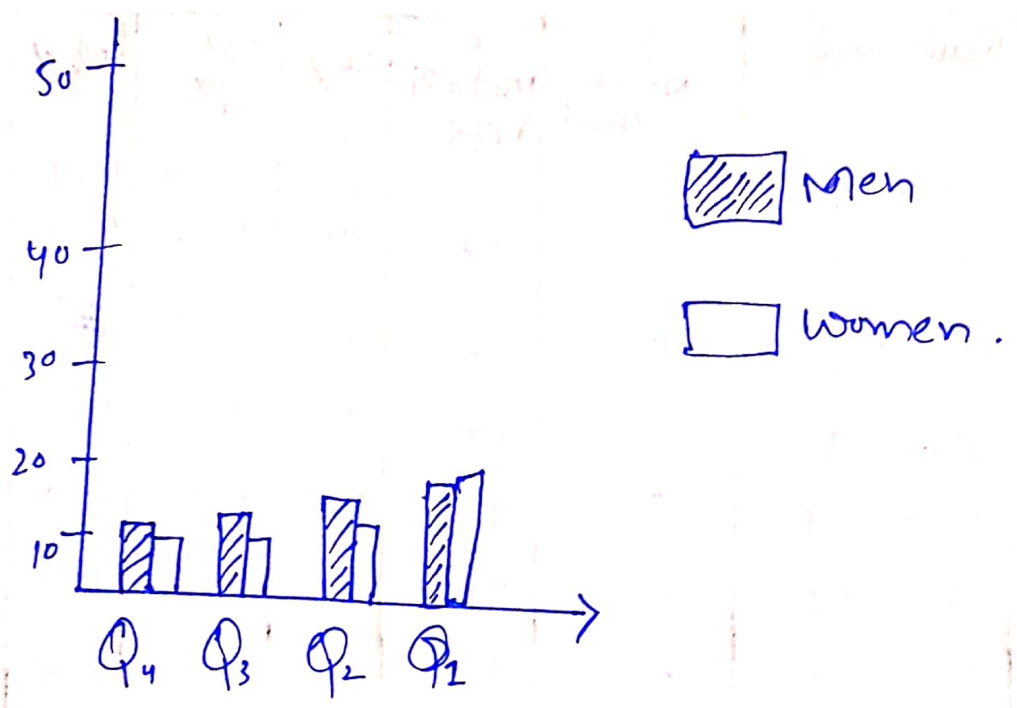
In fresh vegetables standard deviation for women is greater than men.

Q No 9

(d) Suitcase diagram of fruits.



for Fish



Q No 03 =
(A)

Rain fall	f No of Years	X Mid = Pi arts	fX	f/x	log x	f log (x)	x - \bar{x}	(x - \bar{x}) ²	f(x - \bar{x})
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	2.50	7.5	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
Total	25		920	0.693	38.8				1373.96

Rain fall	f No of Years	f (x - \bar{x})	(C.L) class boundaries	(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	2.6	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

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

$$\boxed{A.M = 36.80}$$

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

$$\boxed{H.M = 36.08}$$

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

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

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

$$\boxed{G.M = 35.48}$$

$$4) \text{ median} = \left(\frac{n}{2}\right)^{\text{th}}$$

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

= (12.5)th, which lies b/w in the

class 34.5 - 39.5. Therefore

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

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

$$= 34.5 + \frac{5}{8} (3.5)$$

$$= 34.5 + 2.19$$

So, $\boxed{\text{Median} = 36.69}$

5) Range = Height class upper boundaries

Range = Lowest class lower boundaries

$$= 59.5 - 19.5$$

$$\boxed{\text{Range} = 40}$$

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

l = lower class boundaries of the modal class

f_m = frequency of the modal class.

f_1 = frequency associated with the class following the modal class.

h = width of class interval

So, the Mode, can be

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

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

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

7) Quartiles:

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

These values 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)th, which associated in the class (29.5 - 34.5).

Therefore

$$\begin{aligned} Q_1 &= l + \frac{h}{7} \left(\frac{n}{4} - c.f\right) \\ &= 29.5 + \frac{5}{7} (6.25 - 4) \\ &= 29.5 + 2.25 \end{aligned}$$

$$\boxed{Q_1 = 31.75}$$

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

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

= (18.75)th, which corresponds in the class, (39.5 - 44.5). Therefore

$$Q_3 = l + \frac{h}{8} \left(\frac{3n}{4} - c.f\right)$$

$$= 39.5 + \frac{5}{8} (18.75 - 17)$$

$$= 39.5 + 1.75$$

$$\boxed{Q_3 = 41.25}$$

Deciles :- Which divide the distribution into ten equal parts, are called deciles. Which is denoted by D_1, D_2, \dots, D_9 (P) 17

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

So, for the practice, we can calculate

D_2

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

= 5th, which corresponds in the class, (29.5 - 34.5).

Therefore,

$$D_2 = L + \frac{h}{f} \left(\frac{2n}{10} - c.f \right)$$
$$= 29.5 + \frac{5}{5} (5 - 4)$$
$$= 29.5 + 1$$

$$\boxed{D_2 = 30.5}$$

9) Percentile :-

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

P_1, P_2, \dots, P_{99}

As,

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

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

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

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

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

$$= 29.5 + 3 \cdot 50$$

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

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

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

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

11) Variance :-

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

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

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

12) Standard Deviation = $\sqrt{\text{variance}}$

$$= \sqrt{54.96}$$

$$\boxed{SD = 7.41}$$

Coefficient of variation (C.V) =

(Page 19)

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

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

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

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

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

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

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

where, Mean = 36.80, Mode = 37

and S.D = 7.41

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

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

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

x	$1/x$	$\log(x)$	$(x - \bar{x})$	$(x - \bar{x})^2$	$ x - \bar{x} $
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
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
37	0.027	1.5682	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	1.6720	5.2	27.04	5.2
47	0.0212	1.6720	5.2	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

(B)

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

$$A.M = 36.8$$

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

$$H.M = 34.25$$

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

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

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

$$G.M = 36.04$$

4) Mode = Most repeated value is called mode

$$\text{So, Mode} = 37$$

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

$$\begin{aligned} \text{Median} &= \left[\left(\frac{n}{2} \right) + 1 \right]^{\text{th}} \\ &= \left[\left(\frac{25}{2} + 1 \right) \right]^{\text{th}} \\ &= (12 + 1)^{\text{th}} \end{aligned}$$

Median = 13th, Integer of a data set
Median = 37

6) Quantiles:

$$\begin{aligned} Q_1 &= \left[\left(\frac{n}{4} \right) + 1 \right]^{\text{th}} \\ &= \left[\left(\frac{25}{4} \right) + 1 \right]^{\text{th}} \\ &= (6.25 + 1)^{\text{th}} \\ &= (7.25)^{\text{th}} \\ &= 7^{\text{th}} \end{aligned}$$

$$Q_1 = 32$$

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

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

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

$$Q_3 = 42$$

7) Deciles

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

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

$$D_2 = 32$$

8) Percentile :-

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

$$= \left[\left(\frac{30 \times 25}{100} \right) \right]^{th} \Rightarrow (7.50+1)^{th} = (8.50)^{th}$$

$$= P_{30} = 9^{th}, \text{ integer}$$

$$P_{30} = 32$$

9) Range = largest value - smallest value

$$R = 57 - 22$$

$$R = 35$$

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

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

$$Q.D = 5$$

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

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

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

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

12) Coefficient of variation (C.V)

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

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

$$C.V = 20.14$$

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

$$= \frac{136.40}{25}$$

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

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

$$= \frac{1172.12}{25}$$

$$\text{Variance} = 46.88$$

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

$$= \sqrt{46.88}$$

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

END Rec:-

A) Describe the purpose of Census.

Purpose of Census:- The purpose of Census is to count the entire population of Country & location of every person of the Country.

B) Census:- The collection of data about every member of the population.

⇒ Detailed information is collected that takes long time to complete conducted by the Government.

Survey:- The collection of data from a part or community of the population.

- Information are collected briefly that takes short time to complete - can be conducted by anyone.

C) From the given information 2011 UK Census attached a response rate of 94% indicated that

it represents the requirements of the (page 27) people that may be accurate.

F) Potential problems in incorporating additional data held by government agencies.

Census is such a difficult task to perform, such problems occurring during performing census.

(i) Server required:- Large server is required to incorporate the additional data.

(ii) Less accuracy:- The data collected may not be accurate.

(iii) Experts are required:- Experts are required to conduct & maintain the data.



END.