

Q1:-

Answer:

(a)

(1) overall Mean Consumption of Fresh vegetables for Men:-

$$\Rightarrow \bar{x}_c = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4}$$

$$\bar{x}_c = \frac{204 + 259 + 266 + 317}{4} = \boxed{262} \text{ Answer}$$

(2)

overall Mean Consumption of Fruits for Men:-

$$\bar{x}_c = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4}$$

$$= \frac{31 + 45 + 69 + 105}{4} = \boxed{63} \text{ Answer}$$

(3) overall Mean Consumption of Rice for Men:-

$$\bar{x}_c = \frac{367 + 337 + 269 + 246}{4}$$

$$= \boxed{304.8} \text{ Answer}$$

(4) Overall Mean Consumption of Meat for Men:-

$$\bar{x}_c = \frac{70 + 62 + 69 + 77}{4}$$

$$= \boxed{69.25} \text{ Answer}$$

(1) Separate overall Mean Consumption of Fresh vegetables for Women:-

$$\bar{x}_c = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4}$$

$$= \frac{178 + 235 + 266 + 304}{4} = \boxed{245.7} \text{ Answer}$$

(2) Overall Mean Consumption of Fruit for Women:-

$$\bar{x}_c = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4}$$

$$= \frac{28 + 46 + 70 + 121}{4} = \boxed{66.25} \text{ Answer}$$

PQ (3)

(3) Overall Mean Consumption of rice for women:-

$$\begin{aligned} \Rightarrow \bar{x}_c &= \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4} \\ &= \frac{315 + 276 + 243 + 220}{4} = \boxed{263.5} \text{ Answer} \end{aligned}$$

(4) Overall Mean Consumption of Meat for women:-

$$\begin{aligned} \Rightarrow \bar{x}_c &= \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4} \\ &= \frac{48 + 43 + 54 + 63}{4} = \boxed{52} \text{ Answer} \end{aligned}$$

→ Overall Standard deviation for Men:-

$$\text{As } S.E = \frac{\sqrt{\Sigma}}{\sqrt{n}}$$

$$\text{Where } \Sigma (S.E) = 0.9 + 0.5 + \dots + 0.3 = 4.50$$

$$n = 1308$$

$$\therefore 4.50 = \frac{\sqrt{\Sigma}}{\sqrt{1308}}$$

$$\sqrt{\Sigma} = 162.75 \approx \boxed{1.63} \text{ Answer}$$

→ Overall Standard deviation for Women:-

$$S.E = \frac{\sigma}{\sqrt{n}}$$

where

$$\Sigma (S.E) = (0.8 + 0.4 + \dots + 0.3) = 3.80$$

$$n = 1540$$

$$\Rightarrow \sigma = (3.80)(\sqrt{1540}) = \boxed{149} \text{ Answer}$$

(b) As far as the given data is concerned it indicates that men on the average consume wheat flour much more than the consumption of root vegetables & milk. It means that wheat flour is much important for life as compared to root vegetables & milk.

(c) According to the given data:-

(1) Females consumes more fruits as compared to males on the average.

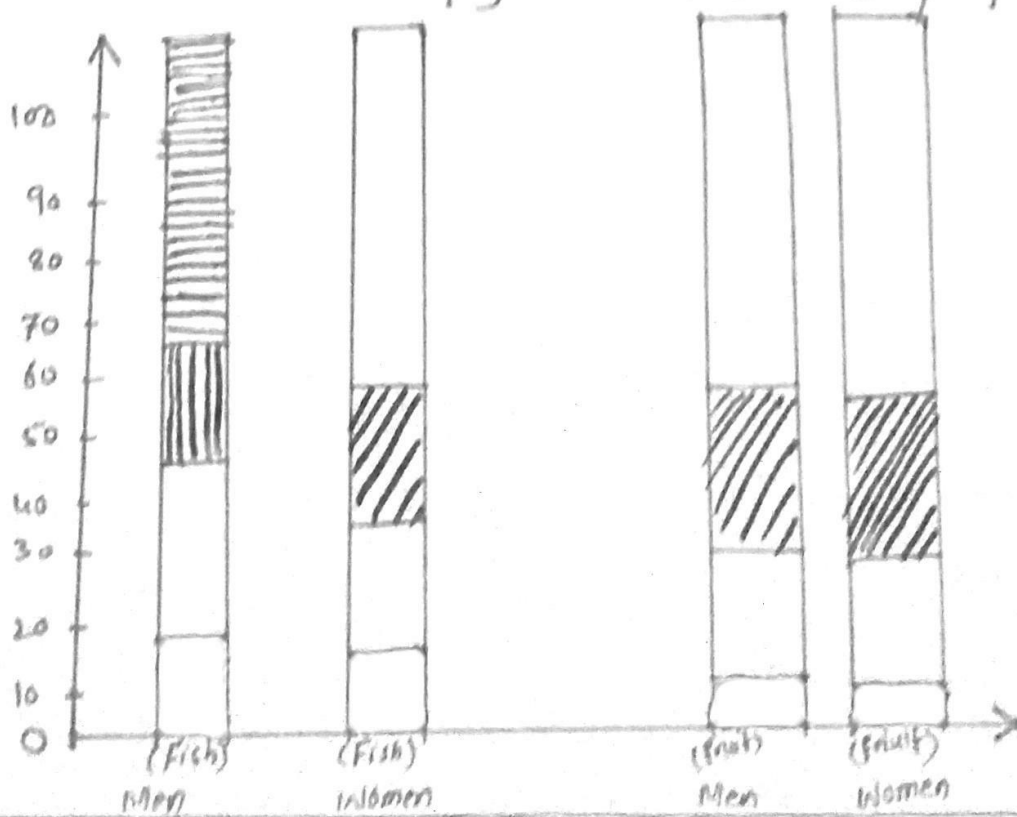
(2) on the other hand male consume rice & fish much more than females on the average.

(d) Suitable diagram to Make Comparison b/w Average Consumption of fruits and fish b/w Men & Women.

Solution: Subdivided Rectangles are suitable in This case, we get

Men (Fish)		Women (Fish)		Men (Fruits)		Women (Fruits)	
Mean	%	Mean	%	Mean	%	Mean	%
23	18.3	19	16.7	31	12.4	28	10.6
28	22.2	21	18.4	45	18	46	17.4
31	24.6	28	24.6	69	27.6	70	26.4
44	34.9	46	40.4	105	42	121	45.7
126		114		250		265	

Now Sub divided Rectangles are constructed as below.



(F) As the standard deviation for women is smaller than from the standard deviation of men therefore commodities consumed by women shows better result.

Q2:-

Answer:-

(a) Purpose of a census:-

The purpose of a Statistical Census is to provide representative findings about the current state & development of the population, Economy, Society, Education, research & environment -

Census Statistics form a significant base for planning, policy development & decision making in various policy making & Business Sector.

(b) Difference b/w Sample Survey & Census:-

Census method is the method of Statistical Enumeration where all members of "the pop" are studied at a more scientific level a country wants to maintain information & record about all households. It's surveying all households in the country using census method. But it is not always practical to collect

information from all the units of the population also. It is time consuming & costly method. Thus an easy way would be to collect data from some representative group from the population & then make observation accordingly. This representative group which contains some units from the whole popⁿ is called sample. Now when sample data is studied & analyzed then it would be a sample survey.

© As far as 94% response attracted towards census JL seems to be accurate & do not create problems towards. The accuracy of the census but not a good practice to do so because census by define represents the whole coverage of the population.

D

⑤ problems of Conducting Census online.
 An online census is one of the social technological innovations that the census has designed to respond to the challenges of counting an increasingly large & diverse society -

while also complying with strict cost constraints.

Although moving to a digital platform has its advantages but also it has risks.

The census must address key design elements to ensure that it & others are not susceptible to cyber attacks.

In addition to these cybersecurity challenges - the move to an online system faces another that the census must overcome - the difficulties may

Traditionally Undercounted Communities

face accessing the internet - Racial & Ethnic minorities - Urban & Rural low

income household immigrants & young children has been historically undercounted or disproportionately

high rates -

In addition to encouraging people to respond online the bureau is also considering using administrative records -

Administrative records to people having / who belongs to racial ethnic - minority groups increasingly the risk of these groups being undercounted -

(F) Solve of the problems:-

(i) The serious problem of conducting census through online system is cyber security - therefore government need to tackle this issue seriously & employed trained staff to combat with this issue.

(ii) Government should launch awareness programmes & lectures through electronic & print media so as to aware peoples regarding filling their questioners online.

(iii) Govt must provide Such facilities through which access to internet for General public is So easy-

(iv) Govt must launch Training programme & Employed Trained Staff to Carried out Such as important Task.

Q No: 3:

Given data:

Classes	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
f	01	03	05	08	05	02	00	01

Answer (3)

Classes	f	x	C.B	C.F	fx	x ²	fx ²	log x	f.log x	F/x	x - \bar{x}	f x - \bar{x}
20-24	1	22	19.5-24.5	1	22	484	484	1.34	1.34	0.05	14.8	14.8
25-29	3	27	24.5-29.5	4	81	729	2187	1.43	4.29	0.11	9.8	29.4
30-34	5	32	29.5-34.5	9	160	1024	5120	1.51	7.53	0.16	4.8	24
35-39	8	37	34.5-39.5	17	296	1369	10952	1.57	12.55	0.22	0.2	1.6
40-44	5	42	39.5-44.5	22	210	1764	8820	1.62	8.12	0.12	5.2	26
45-49	2	47	44.5-49.5	24	94	2209	4418	1.67	3.34	0.04	10.2	20.4
50-54	0	52	49.5-54.5	24	00	2704	00	1.72	00	00	15.2	00
55-59	1	57	54.5-59.5	25	57	3249	3249	1.76	1.76	0.02	20.2	20.2
Σ	25				920		35239		38.93	0.72		136.4

$$\textcircled{1} \text{ A.M} = \frac{\Sigma fx}{\Sigma f} = \frac{920}{25} = \boxed{36.80} \text{ Answer}$$

$$\textcircled{2} \text{ G.M} = \text{Anti-log} \left[\frac{\Sigma f \log x}{\Sigma f} \right] = \text{A. log} \left[\frac{38.93}{25} \right]$$

$$\Rightarrow \boxed{\text{G.M} = 36.07}$$

$$(3) \text{ H.M} = \frac{\sum f}{\sum (f/x)} = \frac{25}{0.72} = \boxed{34.72} \text{ Ans.}$$

$$(4) \text{ Median} = L + \frac{h}{f} \left(\frac{n}{2} - C.F \right)$$

Now first of all we here to calculate the median class by using the following formula.

$$\Rightarrow \text{Median class} = \text{Size of } \left(\frac{n+1}{2} \right)^{\text{th}} \text{ item}$$

$$\text{Where } n = 25$$

$$\therefore \text{Median class} = \text{Size of } \left(\frac{25+1}{2} \right)^{\text{th}} \text{ item}$$

$$\Rightarrow \text{Median class} = \text{Size of } 13^{\text{th}} \text{ item}$$

$$\Rightarrow \text{Median class} = 34.5 \text{ --- } 39.5$$

Now;

$$\therefore \text{Median} = 34.5 + \frac{05}{08} \left(\frac{25}{2} - 09 \right)$$

$$\Rightarrow \text{Median} = 34.5 + 0.63(3.5)$$

$$= 34.5 + 2.21$$

$$\boxed{\text{Median} = 36.71} \text{ Answer}$$

$$\textcircled{5} \quad \text{Mode} = L + \frac{f_m - f_0}{2f_m - f_0 - f_1} \times h$$

$$\therefore \text{Mode} = 34.5 + \frac{08 - 05}{2(8) - 05 - 05} \times 5$$

$$\Rightarrow \text{Mode} = 34.5 + \frac{03}{06} \times 5$$

$$= 34.5 + 2.50$$

$$\Rightarrow \boxed{\text{Mode} = 37} \quad \text{Answer}$$

⑥ Quartiles = ?

$$\Rightarrow Q_i = L + \frac{h}{f} \left(\frac{nx_i}{4} - C.f \right)$$

Now;

$$\Rightarrow Q_1 = L + \frac{h}{f} \left(\frac{nx_1}{4} - C.f \right)$$

First of all we have to calculate the Quartile class.

$$\Rightarrow \text{Quartile class } Q_1 = \text{Size of } \frac{1(25+1)}{4} \text{th item}$$

$$\Rightarrow \text{class containing } Q_1 = \text{Size of } 7\text{th item}$$

11(13)

∴ class containing $Q_1 = 295 \rightarrow 315$

$$\Rightarrow Q_1 = L + \frac{h}{f} \left(\frac{n+1}{4} - c.f \right)$$

$$\Rightarrow Q_1 = 295 + \frac{05}{05} \left(\frac{25 \times 1}{4} - 4 \right)$$

$$\Rightarrow \boxed{Q_1 = 31.75} \text{ Answer}$$

2) $Q_2 =$ 2nd Quartile = Median And Median
is already calculated which is 36.71

$$\therefore \boxed{Q_2 = 36.71} \text{ Answer}$$

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

Now is/ of All we have to compare
the class having " Q_3 "

∴ Class containing $Q_3 =$ Size of $\frac{3(n+1)}{4}$ th item

Class containing $Q_3 =$ Size of $\frac{3(25+1)}{4}$ th item

Class containing $Q_3 =$ Size of "20th" item

Class containing $Q_3 = 39.5 - 44.5$ OR

$$\Rightarrow Q_3 = L + \frac{h}{f} \left(\frac{n \times 3}{4} - C.F \right)$$

$$\Rightarrow Q_3 = 39.5 + \frac{5}{0.5} \left(\frac{25 \times 3}{4} - 17 \right)$$

$$\Rightarrow Q_3 = 39.5 + 1(1.75)$$

$$\Rightarrow \boxed{Q_3 = 41.25} \text{ Answer:}$$

(7) Deciles = ?

$$\Rightarrow D_i = L + \frac{h}{f} \left(\frac{n \times i}{10} - C.F \right)$$

Now (i) $D_1 = L + \frac{h}{f} \left(\frac{n \times 1}{10} - C.F \right)$

First of all we have to complete Decile class

\therefore class containing $D_1 =$ Size of $\frac{1(n+1)}{10}$ th item

\Rightarrow class containing $D_1 =$ Size of $\frac{1(25+1)}{10}$ th item.

\therefore class containing $D_1 =$ 3rd item

\therefore Class containing $D_1 = 24.5 \text{ --- } 29.5$

$$\Rightarrow D_1 = L + \frac{h}{f} \left(\frac{n \times 1}{10} - c.f \right) \text{th}$$

$$\Rightarrow D_1 = 24.5 + \frac{0.5}{0.3} \left(\frac{25 \times 1}{10} - 0.1 \right)$$

$$\Rightarrow D_1 = 24.5 + 2.50$$

$$\Rightarrow \boxed{D_1 = 27}$$

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

\Rightarrow Decide class = size of $\frac{2(n+1)}{10}$ th item

\Rightarrow Class containing $D_2 =$ size of $\frac{2(25+1)}{10}$ th item

\therefore class containing $D_2 =$ size of 5th item

\Rightarrow class containing $D_2 = 29.5 \text{ --- } 34.5$

$$\Rightarrow D_2 = 29.5 + \frac{0.5}{0.5} \left(\frac{25 \times 2}{10} - 0.4 \right)$$

$$\Rightarrow D_2 = 29.5 + 1(1)$$

$$\Rightarrow \boxed{D_2 = 30.5} \text{ Answer}$$

$$3) D_3 = L + \frac{h}{f} \left(\frac{n \times 3}{10} - C.f \right)$$

Now; class containing $D_3 =$ Size of $\frac{3(n+1)}{10}$ th item

\Rightarrow class containing $D_3 =$ size of $\frac{3(25+1)}{10}$ th item

\Rightarrow class containing $D_3 =$ size of 8th item

\Rightarrow class containing $D_3 = 29.5 - 34.5$

$$\Rightarrow D_3 = L + \frac{h}{f} \left(\frac{n \times 3}{10} - C.f \right)$$

Where; $L = 29.5$, $h = 0.5$, $f = 0.5$

$n = 25$, $C.f = 0.4$

$$\Rightarrow D_3 = 29.5 + \frac{0.5}{0.5} \left(\frac{25 \times 3}{10} - 0.4 \right)$$

$$\Rightarrow D_3 = 29.5 + 1(3.50) = 33$$

$$\boxed{D_3 = 33} \text{ Answer}$$

08) Percentiles:

$$\Rightarrow P_i = L + \frac{h}{f} \left(\frac{n \times i}{100} - C.F \right)$$

$$\textcircled{1} P_{10} = L + \frac{h}{f} \left(\frac{n \times 10}{100} - C.F \right) \rightarrow \textcircled{A}$$

\Rightarrow Class containing P_{10} = Size of $\frac{10(n+1)}{100}$ th item

\Rightarrow Class containing P_{10} = Size of $\frac{10(25+1)}{100}$ th item

\Rightarrow Class containing P_{10} = Size of 3rd item.

\Rightarrow Class containing P_{10} = 24.5 — 29.5

Now;

$$\Rightarrow P_{10} = L + \frac{h}{f} \left(\frac{n \times 10}{100} - C.F \right)$$

$$\Rightarrow P_{10} = 24.5 + \frac{05}{03} \left(\frac{25 \times 10}{100} - 1 \right)$$

$$\Rightarrow P_{10} = 24.5 + 1.67 (1.50)$$

$$\Rightarrow \boxed{P_{10} = 27.01} \text{ Answer}$$

$$2) P_{30} = L + \frac{h}{f} \left(\frac{n \times 30}{100} - c.f \right)$$

\Rightarrow Class containing P_{30} = size of $30 \left(\frac{n+1}{100} \right)^{th}$ item

\Rightarrow " " " = size of $30 \left(\frac{25+1}{100} \right)^{th}$ item

\Rightarrow class containing P_{30} = size of 8th item

\Rightarrow " " " = 29.5 — 34.5

$$\Rightarrow P_{30} = 29.5 + \frac{05}{05} \left(\frac{25 \times 30}{100} - 04 \right)$$

$$\Rightarrow P_{30} = 29.5 + 1(3.5) = 33$$

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

$$3) P_{75} = L + \frac{h}{f} \left(\frac{n \times 75}{100} - c.f \right)$$

\Rightarrow class containing P_{75} = size of $\frac{75(25+1)}{100}$ th item

\Rightarrow " " P_{75} = 20th item

\Rightarrow class containing P_{75} = 39.5 — 44.5

Pg (22)

$$\text{Now } P_{75} = 39.5 + \frac{05}{05} \left(\frac{25 \times 75}{100} - 17 \right)$$

$$\Rightarrow \boxed{P_{75} = 41.25} \text{ Answer}$$

$$\begin{aligned} 09) \Rightarrow \text{Range} &= x_L - x_s \\ &= 59 - 20 \end{aligned}$$

$$\Rightarrow \boxed{\text{Range} = 39} \text{ Answer}$$

$$10) \text{ M.D} = \frac{\sum f |x_i - \bar{x}|}{\sum f}$$

$$\Rightarrow \text{M.D} = \frac{136.4}{25} = 5.46$$

$$\Rightarrow \boxed{\text{M.D} = 5.46} \text{ Answer}$$

$$11) \text{ Q.D} = \frac{Q_3 - Q_1}{2}$$

$$\text{where } Q_3 = 41.25 \text{ \& } Q_1 = 31.75$$

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

$$\Rightarrow \boxed{\text{Q.D} = 0.65} \text{ Answer}$$

$$12) \text{ Variance} = \sigma^2 = \frac{\sum f_x^2}{\sum f} - \left(\frac{\sum f_x}{\sum f} \right)^2$$

$$\Rightarrow \sigma^2 = \frac{35230}{25} - \left(\frac{920}{25} \right)^2$$

$$\Rightarrow \sigma^2 = 1409.20 - 1354.24$$

$$\Rightarrow \boxed{\sigma^2 = 54.96} \text{ Answer.}$$

13) Standard deviation:

$$\therefore \sigma = \sqrt{\text{Variance}}$$

$$\Rightarrow \sigma = \sqrt{54.96} = 7.41$$

$$\Rightarrow \boxed{\sigma = 7.41} \text{ Answer.}$$

14) Co-efficient of variance.

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

where S.D = 7.41 & $\bar{x} = 36.80$

$$\Rightarrow \text{Co-efficient of variation} = \frac{7.41}{36.80} \times 100$$

$$\boxed{C.V = 20.14\%} \text{ Answer}$$

PQ (24)

12

$$15) \text{ Skewness} = S_K = \frac{3(\text{Mean} - \text{Median})}{S.D}$$

This is Karl Pearson Co-efficient of
Skewness

$$\therefore S_K = \frac{3(36.80 - 36.71)}{7.41}$$

$$S_K = 0.04 = \text{+ive}$$

It indicates that the given disⁿ
is +ively Skewed disⁿ.

Ques

- (b) Convert the data into Ungrouped data:-
So we take only rainfall column.

Rainfall	Column
20-24	u_i $\frac{20+24}{2} = \frac{44}{2} = 22$
25-29	27
30-34	32
35-39	37
40-44	42
45-49	47
50-54	52
55-59	57

- (i) A.M = ?

Here

$$u_i = 22, 27, 32, 37, 42, 47, 52, 57$$

So we know that

$$A.M = \frac{\sum x_i}{n}$$

$$A.M = \frac{22+27+\dots+57}{8}$$

$$A.M = \frac{316}{8}$$

$$A.M = 39.5$$

(ii) G.M = ?

We know that

$$G = \sqrt[n]{x_1 \times x_2 \times \dots \times x_n}$$

$$G = \sqrt[8]{22 \times 27 \times 32 \times 37 \times 42 \times 47 \times 52 \times 57}$$

Taking Log on both Side :-

$$\log G = \log (22 \times 27 \times 32 \times 37 \times 42 \times 47 \times 52 \times 57)^{1/8}$$

$$\log G = \frac{1}{8} \log [22 \times 27 \times 32 \times 37 \times 42 \times 47 \times 52 \times 57]$$

$$\log G = \frac{1}{8} [\log 22 + \log 27 + \log 32 + \log 37 + \log 42 + \log 47 + \log 52 + \log 57]$$

$$= \frac{1}{8} [1.35 + 1.432 + 1.506 + 1.569 + 1.624 + 1.673 + 1.717 + 1.756]$$

$$= \frac{1}{8} [12.627]$$

$$\log G = 1.578$$

Taking Antilog on both Sides

$$\text{Antilog} [\log G] = \text{Antilog} [1.578]$$

$$G = \text{Antilog} [1.578]$$

(iii) H.M = ?

Formula

$$H.M = \frac{n}{\sum_{i=1}^n \frac{1}{x_i}} \quad n=8$$

$$H.M = \frac{8}{\frac{1}{22} + \frac{1}{27} + \frac{1}{32} + \frac{1}{37} + \frac{1}{42} + \frac{1}{47} + \frac{1}{52} + \frac{1}{57}}$$

$$H.M = 8$$

$$\frac{8}{0.046 + 0.038 + 0.032 + 0.028 + 0.024 + 0.022 + 0.020 + 0.018}$$

$$H.M = \frac{8}{0.408} = \boxed{19.608} \text{ Answer}$$

(iv) Median = ?

As we know that formula for Median:-
putting the value:-

$$x_i = 22, 27, 32, 37, 42, 47, 52, 57$$

$$\begin{aligned} \text{Median} &= \frac{37 + 42}{2} \\ &= \frac{79}{2} \\ &= \boxed{39.5} \text{ Answer} \end{aligned}$$

(v) Mode = ?

Def: of Mode:-

A value which occurs most frequently in a set of data. A set of data may have more than one mode or no mode at all when each observation occurs the same number of times. So there are all the numbers are same time.

$$x = 22, 27, 32, 37, 42, 47, 52, 57.$$

(vi)

Quartile = ?

Formula:-

$$Q_1 = \frac{n+1}{4}, \quad Q_3 = \frac{3(n+1)}{4}$$

Data 22, 27, 32, 37, 42, 47, 52, 57

$$n = 8$$

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

$$Q_1 = \frac{8+1}{4}$$

$$Q_1 = \frac{9}{4} \quad \text{e.g. } \boxed{\text{answer}}$$

$$Q_1 = 2.25$$

$$Q_1 = 2^{\text{th}} + 0.25 (3^{\text{rd}} - 2^{\text{nd}})$$

$$Q_1 = 27 + 0.25 (32 - 27)$$

$$Q_1 = 27 + 0.25 (5)$$

$$Q_1 = 28.25$$

$$Q_3 = \frac{3(n+1)}{4} = \frac{3(8+1)}{4} = \frac{3(9)}{4} = \frac{27}{4}$$

$$Q_3 = \frac{27}{4} = 6.75$$

$$Q_3 = 6^{\text{th}} + 0.75 (7^{\text{th}} - 6^{\text{th}})$$

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

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

$$= \boxed{50.75} \quad \text{ANSWER}$$