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Q1 (a)

Mean consumption Fresh vegetable for

$$\text{Mean} = \frac{204 + 259 + 266 + 317}{4}$$

$$= \frac{1046}{4}$$

$$= \boxed{261.5 \text{ grams per day}}$$

Mean consumption of fruits for men =

$$\frac{31 + 45 + 59 + 105}{4}$$

$$= \frac{250}{4}$$

$$= \boxed{62.5 \text{ per gram}}$$

Women

Mean consumption of vegetables for

$$\text{women} = \frac{178 + 235 + 266 + 304}{4}$$

$$= \frac{983}{4}$$

$$= 245.75 \text{ grams per day!}$$

mean consumption of fruits for

$$\text{women} = \frac{28 + 46 + 70 + 121}{4}$$

$$= \frac{265}{4}$$

$$= 66.25 \text{ grams per day}$$

Mean consumption of rice for

$$\text{women} = \frac{315 + 276 + 243 + 220}{4}$$

$$= \frac{1054}{4}$$

$$= 263.5 \text{ grams per day.}$$

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$$\begin{aligned} \text{Mean consumption of rice for} \\ \text{Men} &= \frac{367 + 337 + 269 + 246}{4} \\ &= \frac{1219}{4} \\ &= \boxed{304.75} \text{ grams per day} \end{aligned}$$

$$\begin{aligned} \text{mean consumption of fish for men} \\ &= \frac{23 + 28 + 31 + 44}{4} \\ &= \frac{126}{4} \\ &= \boxed{31.5} \text{ grams per day} \end{aligned}$$

$$\begin{aligned} \text{mean consumption of meat} \\ \text{for men} &= \frac{70 + 61 + 69 + 77}{4} \\ &= \frac{277}{4} \\ &= \boxed{69.25} \text{ grams per day} \end{aligned}$$

Q No "2" The Given data is as follows

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

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Now in order to compute the required terms we proceed as below:

Classes	f	x	C.B	C.F	fx	x ²	fx ²	log _e x	f log _e x	f/x	x - x̄	f x - x̄
20-24	01	22	17.5-24.5	01	22	484	484	1.34	1.34	0.05	14.8	14.8
25-29	03	27	24.5-29.5	04	81	729	2187	1.42	4.29	0.11	9.8	29.4
30-34	05	32	29.5-34.5	09	160	1024	5120	1.51	7.53	0.16	4.8	24
35-39	08	37	34.5-39.5	17	296	1369	10952	1.57	12.55	0.22	0.2	1.6
40-44	05	42	39.5-44.5	22	210	1764	8820	1.62	8.12	0.12	5.2	26
45-49	02	47	44.5-49.5	24	94	2209	4418	1.67	3.34	0.04	10.2	20.4
50-54	00	52	49.5-54.5	24	00	2704	00	1.72	00	00	15.2	00
55-59	01	57	54.5-59.5	25	57	3249	3249	1.74	1.76	0.02	20.2	20.2
Σ	25				920		35230		38.93	0.72		136.4

$$\text{① A.M} = \frac{\sum fx}{\sum f} = \frac{920}{25} = 36.80 \text{ Ans}$$

$$\text{② G.M} = A \cdot \log \left[\frac{\sum f \log_e x}{\sum f} \right] = A \cdot \log \left[\frac{38.93}{25} \right]$$

$$\text{G.M} = 36.07 \text{ Ans.}$$

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

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

Now 1st of all we have to calculate the median class by using the following formula.

i.e. Median class = size of $\left(\frac{n+1}{2}\right)^{\text{th}}$ item

where $n = 25$

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

Median class = size of "13th" item or

Median class = 34.5 — 39.5

$$\therefore \text{Median} = 34.5 + \frac{0.5}{0.8} \left(\frac{25}{2} - 0.9 \right)$$

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

$$\text{Median} = 34.5 + 2.21$$

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

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$$\textcircled{5} \text{ Mode} = c + \frac{f_m - f_o}{2f_m - f_o - f_i} \times h$$

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

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

$$\text{mode} = 34.5 + 2.50 = \boxed{37} \text{ Ans}$$

$\textcircled{6}$ Quartiles = ?

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

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

1st of all we have to calculate
the Quartile class

\therefore Quartile class = size of $\frac{(n+1)}{4}$ th item

\therefore class containing Q_1 = size of $\frac{1(25+1)}{4}$ th item

class containing Q_1 = size of 7th item or

class containing $Q_1 = 29.5 - 34.5$
Now

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

$$Q_1 = 29.5 + \frac{0.5}{0.5} \left(\frac{25 \times 1}{4} - 0.4 \right)$$

$$Q_1 = 29.5 + 1(2.25) = \boxed{31.75} \text{ Ans}$$

② $Q_2 = 2\text{nd Quartile} = \text{Median}$

And median is already calculated

which is 36.71

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

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

Now 1st of all we have to compute the class having " Q_3 "

\therefore class containing $Q_3 =$ size of
 $\frac{3(n+1)}{4}$ th item

class containing $Q_3 =$ size of $\frac{3(25+1)}{4}$ item

class containing $Q_3 =$ size of "20th" item

class containing $Q_3 = 39.5 - 44.5$ on

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

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

$$Q_3 = 39.5 + 1(1.75) = \boxed{41.25} \text{ Ans}$$

⑦ Deciles = ?

$$D_i = L + \frac{h_i}{f} \left(\frac{n \times i}{10} - c.f. \right)$$

Now ① $D_1 = L + \frac{h_1}{f} \left(\frac{n \times 1}{10} - c.f. \right)$

1st of all we have to compute the Decile class

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

∴ class containing $D_1 =$ size of $\frac{1(25+1)}{10}$ th item

" " = 3rd item

Class containing $D_1 = 24.5 - 29.5$
Now

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

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

$$D_1 = 24.5 + 2.50 = \boxed{27} \text{ Ans}$$

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

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

\Rightarrow class containing $D_2 =$ size of $\frac{2(2.5+1)}{10}$ th item

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

\Rightarrow " " " " = 29.5 - 34.5

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

$$D_2 = 29.5 + 1 (1) = \boxed{30.5} \text{ Ans}$$

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

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

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

class containing $D_3 =$ size of 8th item

class containing $D_3 = 29.5 - 34.5$

Now

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

where $L = 29.5$, $h = 0.5$, $f = 05$

$n = 25$ $c.f = 04$

$$D_3 = 29.5 + \frac{0.5}{05} \left(\frac{25 \times 3}{10} - 04 \right)$$

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

Oh

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

Question #3

Class	Frequency
20-24	1
25-29	3
30-34	5
35-39	8
40-44	5
45-49	2
50-54	0
55-59	1

Class (1)	Frequency ^(f) (2)	Mid value ^(x) (3)	$d = \frac{x-A}{h} = \frac{x-42}{5}$ $n=42, h=5$ (4)	f.d $(5) = (2) \times (4)$	fd^2 $(6) = (5) \times (4)$	cf (7)
20-24	1	22	-4	-4	16	1
25-29	3	27	-3	-9	27	4
30-34	5	32	-2	-10	20	9
35-39	8	37	-1	-8	8	17
40-44	5	42=A	0	0	0	22
45-49	2	47	1	2	2	24
50-54	0	52	2	0	0	24
55-59	1	57	3	3	9	25
--	--	---	---	---	---	--
	n=25	---	---	$\sum fd = -26$	$\sum fd^2 = 82$	--

$$\text{Mean } \bar{x} = A + \frac{\sum fd}{n} \cdot h$$

$$= 42 + \frac{-26}{25} \cdot 5$$

$$= 42 + -1.04 \cdot 5$$

$$= 42 + -5.2$$

$$= 36.8$$

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$$Q_3 = L + \frac{3n - cf}{f} \cdot c$$

$$= 39.5 + \frac{18.75 - 17}{5} \cdot 5$$

$$= 39.5 + \frac{1.75}{5} \cdot 5$$

$$= 39.5 + 1.75$$

$$= 41.25$$

$$\text{Co-efficient of variation (sample)} = \frac{S}{\bar{x}} \cdot 100\%$$

$$= \frac{7.5664}{36.8} \cdot 100\%$$

$$= 20.56\%$$

Here $n = 25$

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Q3 class:

class with $\left(\frac{3n}{4}\right)^{\text{th}}$ value of the
observation in cf column

= $\left(\frac{3 \cdot 25}{4}\right)^{\text{th}}$ value of the
observation in cf column

= $(18.75)^{\text{th}}$ value of the
observation in cf column
and it lies in the class
40-44.

\therefore Q3 class: 39.5 - 44.5

The lower boundary point of
39.5 - 44.5 is 39.5

$\therefore L = 39.5$

Sample standard deviation $s = \sqrt{\frac{\sum f \cdot d^2 - \frac{(\sum f \cdot d)^2}{n}}{n-1}}$

$$= \sqrt{\frac{82 - \frac{(-26)^2}{25}}{24} \cdot 5}$$

$$= \sqrt{\frac{82 - 27.04}{24} \cdot 5}$$

$$= \sqrt{\frac{54.96}{24} \cdot 5}$$

$$= \sqrt{2.29 \cdot 5}$$

$$= 1.5133 \cdot 5$$

$$= 7.5664$$

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$$Z = L + \left(\frac{f_i - f_0}{2 \cdot f_i - f_0 - f_2} \right) \cdot c$$

$$= 34.5 + \left(\frac{8 - 5}{2 \cdot 8 - 5 - 5} \right) \cdot 5$$

$$= 34.5 + \left(\frac{3}{6} \right) \cdot 5$$

$$= 34.5 + 2.5$$

$$\text{Sample variance } s^2 = \left(\frac{\sum f \cdot d^2}{n-1} - \frac{(\sum f \cdot d)^2}{n} \right) \cdot h^2$$

$$= \left(\frac{82 - \frac{(26)^2}{25}}{24} \right) \cdot 5^2$$

$$= \left(\frac{82 - 27.04}{24} \right) \cdot 25$$

$$= \frac{54.96}{24} \cdot 25$$

$$= 2.29 \cdot 25$$

$$= 57.25$$

$$\begin{aligned}
 \text{Median } M &= L + \frac{\frac{n}{2} - cf}{f} \cdot c \\
 &= 34.5 + \frac{12.5 - 9}{8} \cdot 5 \\
 &= 34.5 + \frac{3.5}{8} \cdot 5 \\
 &= 34.5 + 2.1875 \\
 &= 36.6875
 \end{aligned}$$

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To find mode class

here, maximum frequency is 8.

∴ The mode class is 34.5 - 39.5

∴ L = Lower boundary point of mode class = 34.5

∴ f_1 = frequency of the mode class = 8

∴ f_0 = frequency of the preceding class = 5

∴ f_2 = frequency of the succeeding class = 5

∴ c = Class length of mode class = 5

To find Median class

= value of $\left(\frac{n}{2}\right)^{\text{th}}$ observation

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

= value of 12th observation

From the column of cumulative frequency cf, we find that the 12th observation lies in class 35-39

∴ The median class is 34.5-39.5

Now

∴ L = Lower boundary point of median class = 34.5

∴ n = Total frequency = 25

∴ cf = Cumulative frequency of the class preceding the median class = 9

∴ f = Frequency of the median class = 8

∴ C = class length of median class = 5

D7 class:

class with $\left(\frac{7n}{10}\right)^{\text{th}}$ value of the
observation in cf column

= $\left(\frac{7.25}{10}\right)^{\text{th}}$ value of the observation
in cf column and it lies
in the class 40-44.

∴ D7 class : 39.5 - 44.5

The lower boundary point of
39.5 - 44.5 is 39.5

∴ $L = 39.5$

$$D7 = L + \frac{\frac{7n}{10} - cf}{f} \cdot c$$

$$= 39.5 + \frac{17.5 - 17}{5} \cdot 5$$

$$= 39.5 + \frac{0.5}{5} \cdot 5$$

$$= 39.5 + 0.5$$

$$= 40$$

class (1)	mid value (2)	f (3)	$f \cdot x$ (4) = (2) x (3)	$(x - \bar{x})$ (5)	$f \cdot (x - \bar{x})^2$ (6) = (3) x (5)	$f \cdot (x - \bar{x})^3$ (7) = (3) x (6)
20-24	22	1	22	-14.8	219.04	-3241.792
25-29	27	3	81	9.8	288.12	-2823.57
30-34	32	5	160	0.2	115.2	552.96
35-39	37	8	296	-4.8	0.32	0.064
40-44	42	5	210	5.2	135.2	703.04
45-49	47	2	94	10.2	208.08	2122.416
50-54	52	0	0	15.2	0	0
55-59	57	1	57	20.2	408.04	8242.408
----	----	----	----	----	----	----
--	--	n=25	$\Sigma f \cdot x = 920$	--	=1374	=4449.6

Sample standard deviation $s = \sqrt{\frac{\Sigma (x - \bar{x})^2}{n-1}}$

$$= \sqrt{\frac{1374}{24}}$$

$$= \sqrt{57.25}$$

$$= 7.5664$$

Sample skewness $= \frac{\Sigma (x - \bar{x})^3}{(n-1) \cdot s^3}$

$$= \frac{4449.6}{24 \cdot (7.5664)^3}$$

$$= \frac{4449.6}{4449.6}$$

$$= 0.428$$

P₂₀ class

class with $\left(\frac{20n}{100}\right)^{\text{th}}$ value of the observation in cf column

- $\left(\frac{20-25}{100}\right)^{\text{th}}$ value of the observation in cf column

- $(5)^{\text{th}}$ value of the observation in cf column and it lies in the class 30-34

∴ P₂₀ class : 29.5 - 34.5

The lower boundary point of 29.5 - 34.5 is 29.5

∴ L = 29.5

$$\begin{aligned} P_{20} &= L + \frac{\frac{20n}{100} - cf}{f} \cdot c \\ &= 29.5 + \frac{5 - 4}{5} \cdot 5 \\ &= 29.5 + \frac{1}{5} \cdot 5 \\ &= 29.5 + 1 \\ &= 30.5 \end{aligned}$$

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Skewness =

$$\begin{aligned} \text{Mean } \bar{x} &= \frac{\sum fx}{\sum f} \\ &= \frac{920}{25} = 36.8 \end{aligned}$$

Skewness:

$$\begin{aligned}\text{Mean } \bar{x} &= \frac{\sum x}{n} \\ &= \frac{59+49+39+29+20}{5} \\ &= \frac{196}{5} \\ &= 39.2\end{aligned}$$

x	$(x - \bar{x})$ $= (x - 39.2)$	$(x - \bar{x})^2$ $= (x - 39.2)^2$	$(x - \bar{x})^3$ $= (x - 39.2)^3$
59	19.8	392.04	7762.392
49	9.8	96.04	941.192
39	-0.2	0.04	-0.008
29	-10.2	104.04	-1061.208
20	-19.2	368.64	7077.552
...
196	0	960.8	564.48

Sample standard deviation = $\sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$

$$= \sqrt{\frac{960.8}{4}}$$

$$= \sqrt{240.2}$$

$$= 15.4984$$

Sample standard deviation s =

$$\sqrt{\frac{\sum dx^2 - \frac{(\sum dx)^2}{n}}{n-1}}$$

$$= \sqrt{\frac{961 - \frac{41^2}{4}}{4}}$$

$$= \sqrt{\frac{961 - 42.25}{4}}$$

$$= \sqrt{\frac{918.75}{4}}$$

$$= \sqrt{229.6875}$$

$$= 15.4984$$

Coefficient of variation (sample) =

$$\frac{s}{\bar{x}} \cdot 100\%$$

$$= \frac{15.4984}{39.2} \cdot 100\%$$

$$= 39.54\%$$

$$\therefore L = 29.5$$

$$Q_1 = L + \frac{\frac{n}{4} - of}{f} \cdot c$$

$$= 29.5 + \frac{6.25 - 4}{5} \cdot 5$$

$$= 29.5 + \frac{2.25}{5} \cdot 5$$

$$= 29.5 + 2.25$$

$$= 31.75$$

Q3 class:

class with $\left(\frac{3n}{4}\right)^{\text{th}}$ value of the observation in cf of column

= $\left(\frac{3 \cdot 25}{4}\right)^{\text{th}}$ value of the observation in cf column

= $(18.75)^{\text{th}}$ value of the observation in cf column and it lies in the class 40-44.

∴ Q3 class: 39.5 - 44.5

The lower boundary point of 39.5 - 44.5 is 39.5

class (1)	f (2)	Mid value (x) (3)	f · x (4) = (2) × (3)	x - \bar{x} = x - 36.8 (5)	f · x - \bar{x} (6) = (2) × (5)
20-24	1	22	22	14.8	14.8
25-29	3	27	81	9.8	29.4
30-34	5	32	160	4.8	24
35-39	8	37	296	0.2	1.6
40-44	5	42	210	5.2	26
45-49	2	47	94	10.2	20.4
50-54	0	52	0	15.2	0
55-59	1	57	57	20.2	20.2
---	---	---	---	---	---
--	n = 25	--	$\Sigma f \cdot x = 920$	--	$\Sigma f \cdot x - \bar{x} = 136.4$

Mean deviation of mean

$$\bar{a}_x = \frac{\Sigma f \cdot |x - \bar{x}|}{n}$$

$$\bar{a}_x = \frac{136.4}{25}$$

$$\bar{a}_x = 5.456$$

Coefficient of mean deviation = $\frac{\bar{a}_x}{\bar{x}}$

$$= \frac{5.456}{36.8}$$

$$= 0.1483$$

Quartile deviation

class	frequency f	cf
20-24	1	1
25-29	3	4
30-34	5	9
35-39	8	17
40-44	5	22
45-49	2	24
50-54	0	24
55-59	1	25
---	---	---
	$n=25$	---

Here, $n = 25$

Q_1 class:

class with $\left(\frac{n}{4}\right)^{\text{th}}$ value of the observation in cf column

$= \left(\frac{25}{4}\right)^{\text{th}}$ value of the observation

in cf column

$= (6.25)^{\text{th}}$ value of the observation in cf column and it lies in the class 30-34.

$\therefore Q_1$ class 29.5-34.5

The lower boundary point of 29.5-34.5 is 29.5

$$\therefore l = 39.5$$

$$Q_3 = l + \frac{\frac{2n}{4} - cf}{f} \cdot c$$

$$= 39.5 + \frac{18.75 - 17}{5} \cdot 5$$

$$= 39.5 + \frac{1.75}{5} \cdot 5$$

$$= 39.5 + 1.75$$

$$= 41.25$$

Quartile deviation = $\frac{Q_3 - Q_1}{2} = \frac{41.25 - 31.75}{2}$

$$= \frac{9.5}{2} = 4.75$$

Coefficient of Quartile deviation =

$$\frac{Q_3 - Q_1}{Q_3 + Q_1} = \frac{41.25 - 31.75}{41.25 + 31.75} = \frac{9.5}{73} = 0.130$$

b) Convert the above given data...

Solution:

x	$dx = x - A$	dx^2
59	20	400
49	10	100
39	0	0
29	-10	100
20	-19	361
---	---	---
Sum $x = 196$	Sum $(dx) = 0$	Sum $(dx^2) = 961$

$$\begin{aligned}\text{Mean bar } x &= (\text{sum } x) / n \\ &= (59 + 49 + 39 + 20) / 5 \\ &= 196 / 5 \\ &= 39.2\end{aligned}$$

bar $x = 39.2$ is not an integer. Use assumed mean method

$$A = 39$$

Median.

Observation: is the ascending order are
20, 29, 39, 49, 59

Here $n=5$ is odd

$m =$ value of $(\frac{n+1}{2})^{\text{th}}$ observation

$=$ value of $(\frac{5+1}{2})^{\text{th}}$ observation

$=$ value of '3rd' observation

$= 39.$

Mode:

In given data, no observation occurs more than once.

Hence the mode of the observations does not exist,

mean mode = 0

Sample variance $s^2 = \frac{\sum dx^2 - (\sum dx)^2/n}{n-1}$

$$= \frac{961 - (1)^2/5}{4}$$

$$= \frac{961 - 0.2}{4}$$

$$= 240.8/4$$

$$= 60.2$$

Geometric mean, Harmonic mean:

x	$\log(x)$	$\frac{1}{x}$
59	4.0775	
49	3.8918	0.0169
39	3.6636	0.0204
29	3.3673	0.0256
20	2.9957	0.0345
--	--	0.05
		--
	$\sum \log(x) = 17.9959$	$\sum \frac{1}{x} = 0.1475$

$$GM \text{ of } x = \text{Antilog} \left(\frac{\sum f \log(x)}{n} \right)$$

$$= \text{Antilog} \left(\frac{17.9959}{5} \right)$$

$$= \text{Antilog} (3.5992)$$

$$= 36.5686$$

co-efficient of variation (sample)

$$= \frac{S}{\bar{x}} \cdot 100\%$$

$$= \frac{15.4984}{39.2} \cdot 100\%$$

$$= 39.54\%$$

skewness:

$$\text{mean } \bar{x} = \frac{\sum x}{n}$$

$$= \frac{59+49+39+29+20}{5}$$

$$= \frac{196}{5}$$

$$= 39.2$$

x	$(x-\bar{x})$ $= (x-39.2)$	$(x-\bar{x})^2$ $= (x-39.2)^2$	$(x-\bar{x})^3$ $= (x-39.2)^3$
59	19.8	392.04	7762.392
49	9.8	96.04	941.192
39	-0.2	0.04	-0.008
29	-10.2	104.04	-1061.208
20	-19.2	368.64	-7077.888
--	--	--	--
196	0	960.8	564.48

$$\text{HM of } x = \frac{n}{\sum \left(\frac{1}{x} \right)}$$

$$= \frac{5}{0.1475}$$

$$= 33.9026$$

Mean deviation

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

$$= \frac{59 + 49 + 39 + 29 + 20}{5}$$

$$= \frac{196}{5} = 39.2$$

x	$ x - \bar{x} = x - 39.2 $
59	19.8
49	9.8
39	0.2
29	10.2
20	19.2
~	~
196	59.2

$$= 20 + 0.5(9)$$

$$= 20 + 4.5$$

$$= 24.5$$

$$Q_3 = \left(\frac{3(n+1)}{4} \right)^{\text{th}} \text{ value of the observation}$$

$$= \left(\frac{3 \cdot 6}{4} \right)^{\text{th}} \text{ value of the observation}$$

$$= (4.5)^{\text{th}} \text{ value of the observation}$$

$$= 4^{\text{th}} \text{ observation} + 0.5 (5^{\text{th}} - 4^{\text{th}})$$

$$= 49 + 0.5(59 - 49)$$

$$= 49 + 0.5(10)$$

$$= 49 + 5 = 54$$

$$\text{Inter Quartile range} = Q_3 - Q_1 = 54 - 24.5 = 29.5$$

$$\text{Quartile deviation} = \frac{Q_3 - Q_1}{2} = \frac{54 - 24.5}{2}$$

$$= \frac{29.5}{2} = 14.75$$

Coefficient of Quartile deviation

$$= \frac{Q_3 - Q_1}{Q_3 + Q_1} = \frac{54 - 24.5}{54 + 24.5} = \frac{29.5}{78.5} = 0.37$$

Mean deviation of mean

$$\sigma_x = \frac{\sum |x - \bar{x}|}{n}$$

$$\sigma_x = \frac{59.2}{5}$$

$$\sigma_x = 11.84$$

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Co-efficient of mean deviation = $\frac{\sigma_x}{\bar{x}}$

$$= \frac{11.84}{39.2}$$

$$= 0.302$$

Quatile deviation:

Arranging observation in the ascending order, we get:

20, 29, 39, 49, 59

Here, $n = 5$

$Q_1 = \left(\frac{n+1}{4}\right)^{\text{th}}$ value of the observation

$= \left(\frac{6}{4}\right)^{\text{th}}$ value of the observation

$= (1.5)^{\text{th}}$ value of the observation