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Bs DT,

Sem #

x

6th

Teacher #

x

Sir

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Exam #

x

mid Term

(1)

Q No 7 is

A) Calculate the overall mean consumption of fresh vegetable fruits vice.

Ans is

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

$$\text{mean of men} = \frac{204 + 259 + 266 + 317}{4} = 261.5$$

$$\text{mean for women} = \frac{178 + 235 + 266 + 304}{4} = 245.75$$

Standard deviation = Standard error

$$\times \sqrt{\text{No of Men}}$$

$$0.9 \times \sqrt{1308} = 32.5$$

Standard deviation = Standard Error  $\times \sqrt{\text{No of women}}$

$$= 0.8 \times \sqrt{1540} = 31.4$$

over all mean.

$$\frac{1308 \times 261.5 + 1540 \times 245.75}{2848}$$

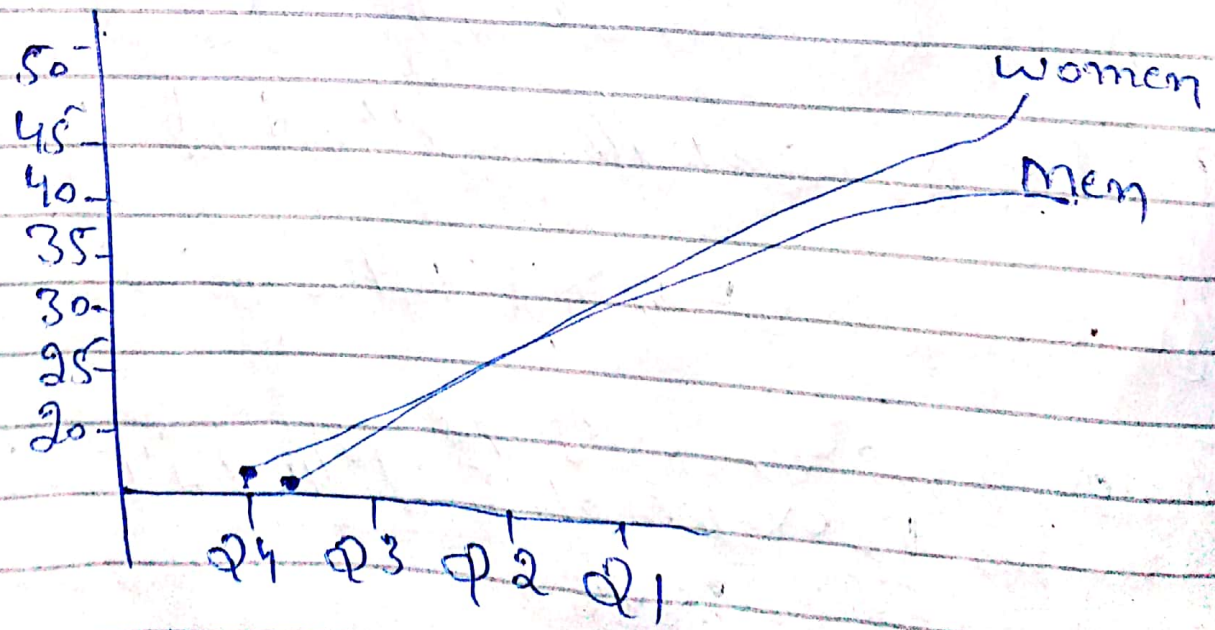
$$= 253$$



B,

Ans: milk, root vegetable and wheat flour are very low for both men and women, in Q4 and Q3 but it rises high in Q2 and Q1 so those who eat most vegetable consume much more milk, root vegetable and wheat flour than those who eat less fresh vegetable.

①, DIAGRAM.





C,

Ans: Rice Consumption falls for men and for women as fresh vegetable Consumption rises.

only rice is the food group to

Show this Pattern and also lies in fresh vegetable.

E,

Ans: Divide men figure of main food group by 1.2 and multiply women figures by 1.2 to obtain

	men	women
Fresh veg	170	178
fruit	26	28
Rice	306	315
wheat flour	66	56
meat	58	48
fish	19	19

There is no very long difference in Pattern Consumption but men eat more meat and wheat flour. while women eat more fresh veg fruit and rice.



Q No 2:

(1)

A:

The Purpose of census is to count the entire population of a country and individuals at location where they actually live. Census counts the number of living in the home their age, sex and race. It helps in the forming and important base for planning, policy development and decreasing numbering.

B)

In census each and every unit of the population is studied in the sampling. The census refer to periodic collection of information about the populace from the entire population. It is more suitable to use census method if population is same in nature.

P.T.



The Census Survey is much bigger in Population Complete to Sample Survey.

Census Survey takes more time.

However it is margin for error in Sample Survey while Census Survey is more correct.

c) obviously not having a full response rate to the census is a problem for the accuracy of census is a problem for the insufficient data will be collected to know about population and of following base for planning and policy development.



①) Ironic response to the Census by the Public signify their into word attitude to the survey and their carelessness in following accurate data.

Questions of these types are invalidated with such abuse responses.

E) Not all of the Population in a internet friendly so may be the response rate might be less other areas of concern are Cost Pressure

Solution;

Entertaining workshop for

bringing awareness of business of

Online Census should be conducted after head.



Given data.

Rainfall (Inches)	No. of year	$x$	$fx$	$logx$	$flogx$	$f/x$	Cumulative frequency	Class boundaries
20-24	1	22	22	1.34	1.34	0.045	1	19.5-24.5
25-29	3	27	81	1.43	4.29	0.111	4	24.5-29.5
30-34	5	32	160	1.50	7.5	0.156	9	29.5-34.5
35-39	8	37	296	1.56	12.48	0.216	17	34.5-39.5
40-44	5	42	210	1.62	8.1	0.119	22	39.5-44.5
45-49	2	47	94	1.97	3.94	0.042	24	44.5-49.5
50-54	0	52	0	1.71	0	0	24	49.5-54.5
55-59	1	57	57	1.75	1.75	0.017	25	54.5-59.5
$\Sigma$	25	920	11.32	0.707				



①. The Arithmetic mean

$$\bar{x} = \frac{\sum fx}{\sum f} \Rightarrow \frac{920}{25} \Rightarrow 36.8$$

$$\boxed{\bar{x} = 36.8}$$

②: The Geometric mean

$$G.M = \text{Anti log} \left( \frac{\sum f \cdot \log x}{\sum f} \right)$$

$$G.M = \text{Anti log} \left( \frac{11.39}{25} \right)$$

$$G.M = \text{Anti log} (0.4528)$$

$$G.M = 2.8$$

③: The harmonic mean

$$H.M = \frac{\sum f}{\sum (f/n)} \Rightarrow \frac{25}{0.7065} \Rightarrow 35.38$$

$$\boxed{H.M = 35.38}$$

④. The Median

The interpolation formula

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

$$n = \sum f = 25 \text{ is odd}$$



$$\text{Median} = \frac{5f+1}{2} = \frac{25+1}{2} = \frac{26}{2} = 13th$$

$$\text{Median} = 34.5 + \frac{5}{8} \left( \frac{25}{2} - 9 \right)$$

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

$$= 34.5 + 0.625(3.5)$$

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

⑤. The mode.

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

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

$$= 34.5 + \frac{3}{26-10} \times 5$$

$$= 34.5 + \frac{3}{16} \times 5$$

$$= 34.5 + 0.9375 \Rightarrow 35.4375$$

$$\boxed{\text{Mode} = 35.4375}$$



⑥ The Quartiles

Since  $n = \Sigma f = 25$  is odd  
then

$$Q_1 = \left(\frac{\Sigma f + 1}{4}\right)^{\text{th}} \text{ value} = \left(\frac{25+1}{4}\right)^{\text{th}} \text{ value}$$

$$Q_1 = 6.5^{\text{th}} \text{ value}$$

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

$$= 29.5 + \frac{5}{5} \left(\frac{25}{4} - 4\right)$$

$$= 29 + 1(2.25) = 29 + 2.25$$

$$\boxed{Q_1 = 31.25}$$

$$Q_2 = 2\left(\frac{\Sigma f + 1}{4}\right)^{\text{th}} \text{ value}$$

$$Q_2 = 2\left(\frac{25+1}{4}\right)^{\text{th}} \text{ value}$$

$$Q_2 = 2\left(\frac{26}{4}\right)^{\text{th}} \text{ value}$$

$$Q_2 = \frac{26}{2}^{\text{th}} \text{ value}$$

$$Q_2 = 13^{\text{th}} \text{ value}$$

Note

We also know that  $Q_2$  is median  
and already find median  
which is

$$\boxed{\text{Median} = Q_2 = 36.68}$$



④ ⑤

$$Q_3 = 3\left(\frac{5f+1}{4}\right) \text{th value}$$

$$Q_3 = 3\left(\frac{25+1}{4}\right) \text{th value}$$

$$Q_3 = 19.5 \text{th value}$$

$$Q_3 = L + \frac{h}{f} \left( \frac{3(5f)}{4} - c.f \right)$$

$$= 39.5 + \frac{8}{8} \left( \frac{3(25)}{4} - 17 \right)$$

$$= 39.5 + (18.75 - 17)$$

$$= 39.5 + 1.75 \Rightarrow 41.25$$

$$\boxed{Q_3 = 41.25}$$

⑦. The Deciles

$$D_1 = \left(\frac{5f+1}{10}\right) \text{th value}$$

$$D_1 = \left(\frac{25+1}{10}\right) \text{th value} \Rightarrow \left(\frac{26}{10}\right) \text{th value}$$

$$D_1 = 2.6 \text{th value}$$

$$D_1 = L + \frac{h}{f} \left( \frac{5f}{10} - c.f \right)$$

$$= 24.5 + \frac{5}{3} \left( \frac{26}{10} - 1 \right)$$

$$= 24.5 + \frac{5}{3} (1.6) \Rightarrow 27.167$$



## 8) The Percentiles

$$P_1 = 27.167$$

$$P_2 = \dots$$

$$P_3 = \dots$$

$$\vdots$$

$$P_{50} = \text{Median} = 36.68$$

$$\vdots$$

$$\vdots$$

$$\vdots$$

$$P_{99} = 99 \left( \frac{57+1}{100} \right) = 99 \left( \frac{26}{100} \right)$$

$$P_{99} = 25.74$$

$$P_{99} = L + \frac{h}{f} \left( \frac{99 \cdot 57}{100} - c.f \right)$$

$$= 54.5 + \frac{5}{1} \left( \frac{99(25)}{100} - 24 \right)$$

$$= 54.5 + 5 (0.75)$$

$$P_{99} = 58.25$$

Note: There  $P_1, P_2, P_3, \dots, P_{99}, P_{100}$   
also.



# 9) The Range =

$$R = X_L - X_S$$

$$X_L = 59, \quad X_S = 20$$

$$R = 59 - 20 =$$

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

# 10) The Mean Deviation

$$M.D = \frac{\sum f |x - \text{Mean}|}{\sum f} \Rightarrow \frac{136}{25} \Rightarrow 5.44$$

$$\boxed{M.D = 5.44}$$

Given data.

$$\bar{x} = 36.8$$

f	X	$x - \bar{x}$	$ x - \bar{x} $	$f x - \bar{x} $	$x^2$	$f x^2$
1	22	-14.8	14.8	14.8	484	484
3	<del>27</del> 27	-9.8	9.8	29.4	729	2187
5	32	-4.8	4.8	24	1024	5120
8	37	0.2	0.2	1.6	1369	10952
5	42	5.2	5.2	26	1764	8820
2	47	10.2	10.2	20.4	2209	4418
0	52	15.2	15.2	0	2704	0
1	57	20.2	20.2	20.2	729	<del>729</del>
				136		3269
						<del>710</del>
						35230



## ⑩ The Quartile Deviation

$$Q.D = \frac{Q_3 - Q_1}{2} \Rightarrow \frac{41.25 - 31.25}{2}$$

$$Q.D = \frac{10}{2} = 5$$

$$\boxed{Q.D = 5}$$

## ⑫ The Variance:

$$S^2 = \frac{\sum f(x - \bar{x})^2}{\sum f} \Rightarrow \frac{\sum fx^2}{\sum f} - \left( \frac{\sum fx}{\sum f} \right)^2$$

~~$$S^2 = \frac{32710}{25} - (36.8)^2$$~~

~~$$S^2 = 1308.4 - 1354.24$$~~

$$S^2 = \frac{35230}{25} - (36.8)^2$$

$$S^2 = 1409.2 - 1354.24$$

$$\boxed{S^2 = 54.96}$$



⑫ The Standard deviation

$$S^2 = 54.96$$

$$S.d = 7.413$$

Taking square root of variance  
~~then~~

$$\text{Variance} = S.d.$$

⑬ The Co-efficient of variation

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

$$C.V = \frac{7.413}{36.8} \times 100$$

$$C.V = 20.144$$



(14) ~~The Pearsonian of Co-efficient~~  
of skewness.

$$SK = \frac{3(\text{Mean} - \text{Median})}{s.d} \quad -3 < SK < 3$$

$$SK = \frac{3(36.8 - 36.68)}{7.41} \Rightarrow$$

$$SK = 0.048$$

Hence the distribution is  
positively skewed.



~~Convert the data into ungrouped data~~  
then,

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

①. The Arithmetic mean

$$\bar{x} = \frac{\sum x}{n} \Rightarrow \frac{22 + 27 + 27 + 27 + 32 + 32 + 32 + 32 + 32 + 37 + 37 + 37 + 37 + 37 + 37 + 37 + 37 + 42 + 42 + 42 + 42 + 42 + 47 + 47 + 57}{25}$$

$$\bar{x} = \frac{920}{25} = 36.8 \Rightarrow \boxed{\bar{x} = 36.8}$$

②. The Geometric mean

x	log x	x	log x	x	log x
22	1.34	37	1.56	47	1.67
27	1.43	37	1.56	47	1.67
27	1.43	37	1.56	57	1.755
27	1.43	37	1.56		
32	1.50	37	1.56	$\Sigma$	5.01
32	1.50	37	1.56		
32	1.50	42	1.62		
32	1.50	42	1.62		
32	1.50	42	1.62		
37	1.56	42	1.62		
37	1.56	42	1.62		



~~$$G.M = \text{Anti log} \left( \frac{\sum \log x}{n} \right)$$~~

$$G.M = \text{Anti log} \left( \frac{5.01}{25} \right)$$

$$G.M = \text{Anti log} (0.2004)$$

$$G.M \approx 1.586$$

0.211

0.216

0.069

③: The harmonic mean

$$H.M = \frac{n}{\sum \left( \frac{1}{x} \right)}$$

x	$\frac{1}{x}$	x	$\frac{1}{x}$
22	0.045	37	0.027
27	0.037	37	0.027
27	0.037	37	0.027
27	0.037	37	0.027
32	0.031	42	0.023
32	0.031	42	0.023
32	0.031	42	0.023
32	0.031	42	0.023
32	0.031	42	0.023
37	0.027	47	0.021
37	0.027	47	0.021
37	0.027	57	0.017
37	0.027	$\Sigma$	0.655



$$H.M = \frac{25}{0.655}$$

$$H.M = 38.167$$

4) Median = size of the  $\left(\frac{n+1}{2}\right)$ th item  
= size of the  $\left(\frac{25+1}{2}\right)$ th item  
= size of the  $(13)$ th item

Median = size of the 13th item

$$Median = 37$$

5) - Mode: in case of individual series  
~~Discrete~~ individual series the most  
repeated value is known as mode  
like.

$$Mode = 37$$

6) Quartile

$Q_1 =$  size of the  $\left(\frac{n+1}{4}\right)$ th item

$Q_1 =$  size of the  $\left(\frac{25+1}{4}\right)$ th item

$Q_1 =$  size of the  $\left(\frac{26}{4}\right)$ th item

$Q_1 =$  size of the 6.5th item



$$Q_1 = 32$$

$$Q_2 = \text{median} = 37$$

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

$$Q_3 = \text{size of the } 3\left(\frac{25+1}{4}\right)\text{th item}$$

$$= \text{size of the } 3\left(\frac{26}{4}\right)\text{th item}$$

$$= \text{size of the } 19.5\text{th item}$$

$$Q_3 = 42$$

(7) Decile

$$D_1 = \text{size of the } \left(\frac{n+1}{10}\right)\text{th item}$$

$$D_1 = \text{size of the } \left(\frac{25+1}{10}\right)\text{th item}$$

$$D_1 = \text{size of the } \left(\frac{26}{10}\right)\text{th item}$$

$$D_1 = \text{size of the } 2.6\text{th item}$$

$$D_1 = 27$$

$$D_5 = \text{which is median} = 37$$



$D_9 = 813$  of the  $9\left(\frac{n+1}{10}\right)$ th item

$D_9 = 813$  of the  $9\left(\frac{25+1}{10}\right)$ th item

$D_9 = 813$  of the  $9\left(\frac{26}{10}\right)$ th item

$D_9 = 813$  of the 23.4th item

$$\boxed{D_9 = 47}$$

⑧ Percentile

$P_1 = 813$  of the  $\left(\frac{n+1}{100}\right)$ th item

$= 813$  of the  $\left(\frac{25+1}{100}\right)$ th item

$= 813$  of the  $\left(\frac{26}{100}\right)$ th item

$P_1 = 813$  of the 0.26th item

$$\boxed{P_1 = 22}$$

$P_{50} = \text{Median} = 37$

Note: there are

~~no~~ 99 percentiles

$P_{70}$

$P_{99} = 813$  of the  $99\left(\frac{n+1}{100}\right)$ th item

$P_{99} = 813$  of the  $99\left(\frac{25+1}{100}\right)$ th item

$P_{99} = 813$  of the 25.74th item

$$\boxed{P_{99} = 57}$$



⑨ The Range  
 Smallest value = 22  
 Largest value = 57

$$\text{Range} = L - S = 57 - 22 = 35$$

$$\boxed{\text{Range} = 35}$$

$$\text{mean} = \bar{x} = 36.8$$

⑩: The mean deviation

$$\text{M.D} = \frac{\sum |x - \text{mean}|}{n}$$

x	x - mean		x	x - mean
22	+14.8	29.4	37	0.2
27	+9.8		37	0.2
27	+9.8		37	0.2
27	+9.8		42	5.2
32	+4.8	24	42	5.2
32	+4.8		42	5.2
32	+4.8		42	5.2
32	+4.8		42	5.2
32	+4.8		47	10.2
37	0.2	20.4	47	10.2
37	0.2		57	20.2
37	0.2			
37	0.2			
37	0.2			
		$\Sigma$		110.4

$$\boxed{\text{M.D} = \frac{110.4}{25} \Rightarrow 4.416}$$



⑪ The Quartile Deviation

$$Q.D = \frac{Q_3 - Q_1}{2} = \frac{42 - 32}{2} = \frac{10}{2} = 5$$

Q.D = 5

⑫ The Variance

$$S^2 = \frac{\sum(x - \bar{x})^2}{n} \Rightarrow \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2$$

$S^2 =$

x	x <sup>2</sup>		x	x <sup>2</sup>	
22	484		37	1369	} 35200
27	729		37	1369	
27	729	} 2187	42	1764	
27	729		42	1764	
32	1024		42	1764	} 8820
32	1024	42	1764		
32	1024	} 5120	42	1764	
32	1024		47	2209	} 4418
32	1024	47	2209		
37	1369		57	3249	
37	1369		<hr/>		
37	1369	} 10952	<del>2160</del> 35200		
37	1369				
37	1369				
37	1369				
37	1369				



$$S^2 = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2$$

$$S^2 = \frac{26410}{25} - (36.8)^2$$

$$S^2 = 1056.4 - 1354.24$$

$$S^2 = 35230 - (36.8)^2$$

$$S^2 = 35230 - 1354.24$$

$$S^2 = 338$$

$$S^2 = 1409.2 - 1354.24$$

$$S^2 = 54.96$$

$$(13) \int S^2 = 54.96$$

The standard deviation

$$S.d = 3.80$$

(14): Co-efficient of variation

$$C.V = \frac{S.d}{\bar{x}} \times 100 = \frac{3.80}{36.8} \times 100$$

$$C.V = 10.32$$



15. ~~Skewness~~

The Pearson of Skewness.

$$SK = \frac{3(\text{mean} - \text{median})}{s.d.}$$

$$SK = \frac{3(36.8 - 37)}{3.8} \Rightarrow \text{But } 36.8 \leq 37.$$

$$SK = \frac{3(37 - 37)}{3.8} = 0$$

SK = 0 The dist<sup>n</sup> is positively skewed or symmetric.