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Exame mid Term exam (spring 2020)

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Course: Bio statics

Q No # 1

Ans:-

(a) mean composition of fresh vegetable for men:

$$\text{mean} = \frac{Q_1 + Q_2 + Q_3 + Q_4}{4} = \frac{217 + 266 + 269 + 204}{4}$$

$$\text{mean} = \frac{1046}{4} = 261.5 \text{ gram per day}$$

mean composition of fruits for men:

$$\text{mean} = \frac{Q_1 + Q_2 + Q_3 + Q_4}{4} = \frac{105 + 69 + 45 + 31}{4}$$

$$\text{mean} = \frac{250}{4} = 62.5 \text{ per gram per day}$$

mean composition of rice for men:

$$\text{mean} = \frac{246 + 269 + 337 + 367}{4}$$

$$\text{mean} = \frac{1219}{4} = 304.75 \text{ gram per day}$$

mean composition of fish for men:

$$\text{mean} = \frac{44 + 31 + 28 + 23}{4} = \frac{126}{4} = 31.5$$

$$\text{mean} = 31.5 \text{ gram per day}$$

mean composition of whole grain for men:

$$\text{mean} = \frac{27 + 6 + 2 + 2}{4} = \frac{37}{4} =$$

$$\text{mean} = 9.25 \text{ gram per day}$$

(11)
mean composition of meat for men:

$$\text{mean} = \frac{77+69+61+70}{4} = \frac{277}{4} = 69.25$$

mean: $\boxed{69.25}$ gram per day

mean composition of milk for men:

$$\text{mean} = \frac{39+23+3+2}{4} = \frac{67}{4} = 16.75$$

mean: $\boxed{16.75}$ gram per day

mean composition of wheat flour for men:

$$\text{mean} = \frac{253+197+114+79}{4} = \frac{643}{4} = 160.75$$

mean: $\boxed{160.75g}$ per day

mean composition of root vegetable for

men:

$$\text{mean} = \frac{29+16+11+7}{4} = \frac{63}{4} = 15.75$$

mean: $\boxed{15.75g}$ per day

Now for women

mean composition of milk for women =

$$\text{mean: } \frac{48+15+4+1}{4} = \frac{68}{4} = 17$$

mean: $\boxed{17g}$ per day

mean composition of meat for ~~women~~ ^{women} =

$$\text{mean: } \frac{63+54+43+48}{4} = \frac{208}{4} = 52 \text{ gm}$$

mean: $\boxed{52g}$ per day

mean composition of whole grain for women.

$$\text{mean: } \frac{22+6+3+1}{4} = \frac{32}{4} = 8 \text{ gm}$$

mean: $\boxed{8g}$ per day

mean composition of Rice for women =

$$\text{mean: } \frac{220+243+276+315}{4} = \frac{1054}{4} = 263.5$$

mean = 263.5 gm per day.

mean composition of fresh vegetable for women =

$$\text{mean: } \frac{304+266+235+178}{4} = \frac{983}{4} = 245.75$$

mean: $\boxed{245.75 \text{ gm}}$ per day.

mean composition of fish for women =

$$\text{mean: } \frac{28+46+21+19}{4} = \frac{114}{4} = 28.5 \text{ g}$$

mean = $\boxed{28.5 \text{ gm}}$ per day

5
7. *linda, inestable*
mean composition of Root vegetable for women =
mean: $\frac{23+17+12+6}{4} = \frac{63}{4} = 15.75$

mean: 15.75 gm per day.

mean composition of wheat flour for women =

mean: $\frac{180+141+118+56}{4} = \frac{495}{4} = 123.75 \text{ gm}$

mean: 123.75 gm per day

mean composition of fruits for women =

mean: $\frac{121+70+46+28}{4} = \frac{265}{4} = 66.25$

mean: 66.25 gm per day

calculate the mean^s of fresh vegetable,
Rice, fruits, meat --- for men and
women.

mean of fish vegetable:

$$\frac{204 + 259 + 266 + 317 + 178 + 235 + 266 + 304}{2}$$

$$= \frac{2029}{2} = 1014.5$$

mean of rice.

$$\frac{367 + 337 + 269 + 246 + 315 + 276 + 243 + 220}{2}$$

$$= \frac{2273}{2} = 1136.5$$

mean of meat:

$$\frac{70 + 61 + 69 + 77 + 48 + 43 + 54 + 63}{2}$$

$$= \frac{485}{2} = 242.5$$

$$\text{mean of fresh vegetable} = \frac{204 + 259 + 266 + 317 + 178 + 235 + 266 + 304}{8}$$

$$\text{mean} = 253.625$$

$$S.D = \sqrt{\frac{(204 - 253.625)^2 + (259 - 253.625)^2 + (317 - 253.625)^2 + (178 - 253.625)^2 + (235 - 253.625)^2 + (266 - 253.625)^2 + (304 - 253.625)^2 + (266 - 253.625)^2}{8}}$$

$$\text{Standard deviation for fresh vegetable} = \boxed{43.89}$$

Now standard deviation for fruit :

$$S.D = \sqrt{\frac{(31 - 61.87)^2 + (45 - 61.87)^2 + (69 - 61.87)^2 + (105 - 61.87)^2 + (28 - 61.87)^2 + (46 - 61.87)^2 + (70 - 61.87)^2 + (121 - 61.87)^2}{8}}$$

$$S.D = \sqrt{\frac{952.95 + 284.59 + 10.87 + 1860.19 + 1147.57 + 257.85 + 66.09 + 2496.35}{8}}$$

$$S.D = \boxed{31.83}$$

$$S.D \text{ of rice} = \sqrt{\frac{(367 - 284.25)^2 + (337 - 284.25)^2 + (269 - 284.25)^2 + (246 - 284.25)^2 + (315 - 284.25)^2 + (276 - 284.25)^2 + (243 - 284.25)^2 + (220 - 284.25)^2}{8}}$$

$$S.D = \sqrt{\frac{3953.26 + 2795.76 + 228.76 + 1453.5 + 953.26 + 66.01 + 1691.26 + 4112.01}{8}}$$

$$S.D = \boxed{43.66}$$

S.D of meat:

$$S.D = \sqrt{\frac{(70-60.62)^2 + (61-60.62)^2 + (69-60.62)^2 + (77-60.62)^2 + (48-60.62)^2 + (43-60.62)^2 + (54-60.62)^2 + (163-60.62)^2}{8}}$$

$$S.D = \sqrt{\frac{87.98 + 0.14 + 70.22 + 268.30 + 159.26 + 310.44 + 43.82 + 566}{8}}$$

$$S.D = 10.87$$

Standard deviation of Fish:

$$S.D = \sqrt{\frac{(23-30)^2 + (28-30)^2 + (31-30)^2 + (44-30)^2 + (19-30)^2 + (21-30)^2 + (78-30)^2 + (46-30)^2}{8}}$$

$$S.D = \sqrt{\frac{49 + 9 + 1 + 196 + 121 + 81 + 4 + 256}{8}}$$

$$S.D = 9.43$$

~~Standard deviation of meat:~~

$$S.D = \sqrt{\quad}$$

S.D of fresh vegetable for man = 7

$$S.D = \sqrt{\frac{(204 - 261.5)^2 + (259 - 261.5)^2 + (266 - 261.5)^2 + (317 - 261.5)^2}{4}}$$

$$S.D = \sqrt{\frac{3306.25 + 6.25 + 20.25 + 3080.25}{4}}$$

$$S.D = 80.08$$

Now for women:

$$S.D = \sqrt{\frac{(178 - 245.76)^2 + (235 - 245.76)^2 + (266 - 245.76)^2 + (304 - 245.76)^2}{4}}$$

$$S.D = 46.11$$

S.D of Rice for men

$$S.D = \sqrt{\frac{(367 - 304.75)^2 + (337 - 304.75)^2 + (269 - 304.75)^2 + (246 - 304.75)^2}{4}}$$

$$S.D = \sqrt{\frac{3875.06 + 1040.06 + 1278.06 + 3457.56}{4}}$$

$$S.D = 49.11$$

For women:

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

$$S.D = \sqrt{\frac{2652.25 + 156.25 + 420.25 + 1892.25}{4}}$$

$$S.D = 35.780$$

Standard Deviation of fruit for man:

$$S.D = \sqrt{\frac{(31-62.5)^2 + (45-62.5)^2 + (69-62.5)^2 + (105-62.5)^2}{4}}$$

$$S.D = \sqrt{\frac{992.25 + 306.25 + 542.25 + 11806.25}{4}}$$

$$S.D = 19.83$$

S.D: for women

$$S.D = \sqrt{\frac{(28-66.25)^2 + (46-66.25)^2 + (70-66.25)^2 + (121-66.25)^2}{4}}$$

$$S.D = \sqrt{\frac{1463.06 + 410.06 + 14.06 + 2997.56}{4}}$$

$$S.D = 34.94$$

S.D: fish for man

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

$$S.D = \sqrt{\frac{72.25 + 12.25 + 156.25 + 0.25}{4}}$$

$$S.D = 7.76$$

Fish for women

$$S.D = \sqrt{\frac{(19-28.5)^2 + (21-28.5)^2 + (28-28.5)^2 + (46-28.5)^2}{4}}$$

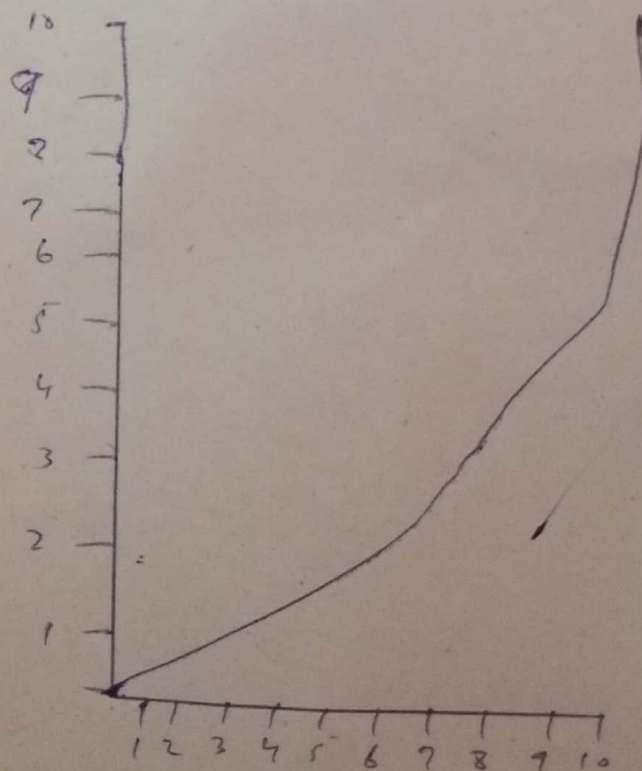
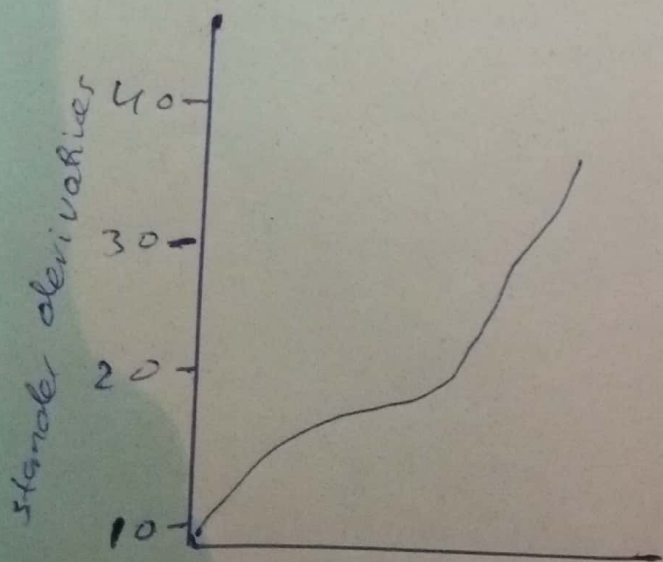
$$= S.D = 10.69$$

(f) If we find a graph the standard deviation for men and women separately it will more accreted then the standard deviation if we find combined SD man and women.

Diagram

Fish

Fruit = D



Q No # 2 part # (a)

Ans: The purpose of census is to count the entire population of a country and individual at location where the adult lives. Census count the number of living in the home, their age, sex and race. It help in the forming and important base for planning policy development and decreasing numbering.

In census

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

→ The census survey is much bigger in population compare to sample survey.

Census survey take more time, however it is major for error in sample survey while census survey is more correct.

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

(d) some response the census by the public signify their into attitude to their survey and their confidence in the following accurate data

Questions of these types are correlated with such above response.

part (c) not all of the population is a interest frankly so may be the response might be less other areas of concern one cost pressure.

part (c) entry workshop for bringing awareness of awareness of entire census should be conducted after that.

Q NO # 3 part: (a) 1

(1) 3

To Find A.M, G.M, H.M, median mode, Quartiles, Deciles, percentiles, Range, M.D, Q.D, variance, standard deviation, coefficient of variation and skewness.

Rain fall	years
22-24	1
25-29	3
30-34	5
35-39	8
40-44	5
45-49	2
50-54	0
55-59	1

Ans: Now we will make another diagram out start.

C.I	class.B	x_i	f_i	$f_i x_i$	$\log x_i$	$f_i \log x_i$	$\frac{1}{x_i}$	$f_i \frac{1}{x_i}$
20-24	19.5-24.5	22	1	22	1.342	1.342	0.045	0.045
25-29	24.5-29.5	27	3	81	1.431	4.293	0.037	0.111
30-34	29.5-34.5	32	5	160	1.505	7.525	0.0312	0.156
35-39	34.5-39.5	37	8	296	1.568	12.544	0.027	0.216
40-44	39.5-44.5	42	5	210	1.623	8.115	0.023	0.115
45-49	44.5-49.5	47	2	94	1.672	3.344	0.021	0.42
50-54	49.5-54.5	52	0	0	1.716	0	0.019	0
55-59	54.5-59.5	57	1	57	1.753	1.755	0.017	0.017
		$\Sigma x_i = 316$	$\Sigma f_i = 25$	$\Sigma f_i x_i = 920$				$\frac{\Sigma f_i \frac{1}{x_i}}{n} = 1.08$

Now A.M = $\frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{920}{25} = \boxed{AM = 36.8}$

G.M = $\text{Antilog} \left[\frac{\Sigma f_i \log x_i}{\Sigma f_i} \right] = \text{Antilog} \left[\frac{38.918}{25} \right] = G.M = \text{Antilog} [1.556]$

P.T.O

$$\text{Now H.M.} = \frac{\Sigma f}{\Sigma \frac{1}{x}} = \frac{25}{1.08} = \boxed{\text{H.M.} = 23.148}$$

Median: $L + \frac{h}{f} \left(\frac{n}{2} - c \right)$ hence media lies on 34.5-39.5

$$\text{Hence } L = 34.5 \quad n = 39.5 - 34.5 = 5 \quad f = 8 \quad c = 9$$

$$\text{Now median} = 34.5 + \frac{5}{8} \left(\frac{n}{2} - c \right) = 34.5 + \frac{5}{8} \left(\frac{25}{2} - 9 \right)$$

$$\text{Median} = 38.687$$

$$\text{Mod} = L + \left(\frac{f_m - f_o}{2f_m - f_u - f_l} \right) \times h$$

$$L = 35 \quad h = 39 - 35 = 4 \quad f_m = 8 \quad f_o = 5 \quad f_u = 5 \quad f_l = 5$$

$$\text{Hence mode} = 17 + \left(\frac{8-5}{2(8)-5-5} \right) \times 4 = 17 + \left(\frac{3}{16-10} \right) \times 4$$

$$= 17 + \left(\frac{3}{6} \right) \times 4 = 17 + \left(\frac{1}{2} \right) \times 4 = 17 + \left(\frac{1}{2} \right) \times 4 =$$

$$= 17 + 2 = 19 \quad \text{Hence Mod} = 19$$

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

$$= 34.5 + \frac{5}{8} \left(\frac{25+1}{4} - 9 \right) = 34.5 + \frac{5}{8} \left(\frac{26}{4} - 9 \right)$$

$$Q_1 = 34.5 - 1.5625$$

$$\boxed{Q_1 = 32.9}$$

$$Q_3 = L + \frac{h}{f} \left\{ 3 \left(\frac{n+1}{4} \right) - c.f \right\} = 34.5 + \frac{5}{8} \left\{ 3 \left(\frac{26}{4} \right) - 9 \right\}$$

$$= 34.5 + 6.56$$

$$\boxed{Q_3 = 41.06}$$

Decile:- $D_2 = L + \left(\frac{2 \times N}{10} - m \right) \times h$

$D_1 = 24.5 + \left(\frac{2 \times 25}{10} - 4 \right) \times 5$

$D_1 = 24.5 + \left(\frac{7.5 - 4}{1} \right) \times 5$

$D_1 = 24.5 + (-0.9) = \boxed{37.6}$

$D_1 = L + \left(\frac{7 \times N}{10} - m \right) \times h$

$D_1 = 24.5 + \left(\frac{17.5 - 17}{1} \right) \times 5$

$D_1 = \boxed{40}$

Range = $59.9 - 19.5 = \boxed{40}$

variance: for variance we find

f	x	Σx	$x - \bar{x}$	$\Sigma (x - \bar{x})$	$(x - \bar{x})^2$	$\Sigma (x - \bar{x})^2$
1	28	36.8	28 - 36.8	-8.8	77.44	77.44
1	27	36.8	27 - 36.8	-9.8	96.04	96.04
5	32	36.8	32 - 36.8	-4.8	23.04	115.2
7	37	36.8	37 - 36.8	0.2	0.04	0.72
5	42	36.8	42 - 36.8	5.2	27.04	135.1
2	47	36.8	47 - 36.8	10.2	104.04	208.08
0	52	36.8	52 - 36.8	15.2	231.04	0
1	57	36.8	57 - 36.8	20.2	408.04	408.04
						$\Sigma (x - \bar{x})^2 = 1374$

$$\text{variance} = \frac{\sum f(n-\bar{x})^2}{\sum f-1}$$

$$\text{variance} = \frac{1374}{25-1} = \frac{1374}{24} = 57.25$$

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

$$S.D = \sqrt{57.25} = 7.566$$

$$\text{co-efficient of variation} = \frac{s}{\bar{x}} \times 100$$

$$= \frac{7.566}{36.8} \times 100 = \boxed{20.5}$$

$$\text{skewness} = \frac{3(\text{mean} - \text{median})}{S.D}$$

$$= \frac{3(36.8 - 38.687)}{7.566} = \boxed{0.74}$$

Q No # 3 part (b)

(1)

36

Ans: we have to change the grouped data to ungrouped data

C-I	X	$x - \bar{x}$	$1/x$
20-24	22	17.5	$1/22 = 0.045$
25-29	27	-17.5	$1/27 = 0.037$
30-34	32	-12.5	$1/32 = 0.031$
35-39	37	-7.5	$1/37 = 0.027$
40-44	42	-2.5	$1/42 = 0.024$
45-49	47	7.5	$1/47 = 0.021$
50-54	52	12.5	$1/52 = 0.019$
55-59	57	17.5	$1/57 = 0.017$

$$\sum x = 316$$

$$\sum 1/x = 0.23$$

First we find A.M

$$A.M = \bar{x} = \frac{\sum x}{n} = \text{Hence } \sum x = 316 \text{ and } n = 8$$

$$\therefore \bar{x} = \frac{316}{8} = 39.5$$

G.M: General formula of G.M for ungrouped data

$$G.M = \sqrt[n]{x_1 \times x_2 \times x_3 \times x_4 \times \dots \times x_n}$$

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

$$H.M = \frac{n}{\sum 1/x} = \frac{8}{0.22} = 36.36$$

P.T.O

Median: As $n=8$ then median is:

$$\begin{aligned}\text{median} &= \frac{1}{2} \left(\frac{n}{2} + n + \frac{n+2}{2} + n \right) \text{ value} \\ &= \frac{1}{2} \left(\frac{8+n}{2} + \frac{10+n}{2} \right) = \frac{1}{2} (4+n + 5+n) \text{ value} \\ &= \frac{1}{2} (37+42) \quad \boxed{\text{median} = 39.5}\end{aligned}$$

Quartiles: $Q_1 = \left(\frac{n+1}{4} \right)^{\text{th}} \text{ item} = \frac{8+1}{4} = \frac{9}{4} = 2.25$

$Q_1 = 2^{\text{nd}} + \frac{1}{4} (3^{\text{rd}} - 2^{\text{nd}}) \text{ item}$

$$27 + \frac{1}{4} (32 - 27) = 27 + \frac{1}{4} (5) = 27 + 1.25$$

$$Q_1 = \boxed{28.5}$$

$$Q_3 = 3 \left(\frac{n+1}{4} \right)^{\text{th}} = 3 \left(\frac{9}{4} \right) = 3 (2.25) =$$

$$Q_3 = \boxed{6.75}$$

$Q_3 = 6^{\text{th}} \text{ item} + \frac{3}{4} (7^{\text{th}} - 6^{\text{th}}) \text{ item}$

$$= 47 + \frac{3}{4} (52 - 47)$$

$$Q_3 = 47 + \frac{15}{4} = 47 + 3.75 = \boxed{50.75}$$

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

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

Deciles:

$$D_3 = 3 \left(\frac{n+1}{10} \right) + 4 \text{ item}$$

$$D_3 = 3 \left(\frac{8+1}{10} \right) = (27) \text{ 4th item}$$

$$D_3 = 2nd + \frac{7}{10} (3rd - 2nd) = 27 + \frac{7}{10} (32 - 27)$$

$$= 27 + \frac{7}{2} = 30.5 \quad \boxed{D_3 = 30.5}$$

$$D_7 = 7 \left(\frac{n+1}{10} \right) = 7(0.9) = 6.3$$

$$D_7 = 6 + n + \frac{3}{10} (7 - 6) = 11 \text{ item}$$

$$47 + \frac{3}{10} (52 - 47) = 47 + \frac{3}{2} = 48.5$$

$$\boxed{D_7 = 48.5}$$

$$\underline{\text{variance}} = \frac{\sum (x_i - \bar{x})^2}{n} = \frac{10500}{8} = \frac{10500}{8}$$

$$\boxed{\text{variance} = 1312.5}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n}} = \sqrt{1312.5}$$

$$\boxed{S.D = 11.45}$$

$$\text{Co-efficient of variation} = \frac{S.D}{\bar{x}} \times 100$$

$$= \frac{11.45}{39.5} \times 100 = 28.99$$

$$\text{Coefficient of variance} = \boxed{28.99}$$

4 - 35

$$\text{skewness} = \frac{3(\text{mean} - \text{median})}{\text{S.D}}$$

$$= \frac{3(39.5 - 39.5)}{11.45} = 0$$

$$\text{skewness} = 0$$