IQRA NATIONAL UNIVERSITY

Name : Sauood Ur Rehman

Department : BS(CS)

Semester : 4th

ID # : 15031

Examination : Mid Term Exam

Subject : Probability and Statistics

Submitted To:Daud Khan Khalil Sir

Dated : 19th April 2020

Name Sawood ur Rahman

ID 15031

Dept BS(CS) 4th semester

M. Daud Sir

Probability and Statistics

(Q1)

(a)

Ans

Class interval	Frequency	class Boundaries	c.f	c.f>
0-4	25	0-4.5	25	2092
5-9	45	4.5-9.5	70	2067
10-14	81	9.5-14.5	151	2022
15-19	143	14.5-19.5	294	1941
20-24	280	19.5-24.5	574	1798
25-29	349	24.5-29.5	923	1518
30-34	374	29.5-34.5	1297	1169
35-39	395	34.5-39.5	1692	795
40-44	400	39.5-44.5	2092	400

C.B = 1st of 2nd class - 1st of 1st class

= 5 - 4

C.B = 1

C.B = 1/2

C.B = 0.5

(2)

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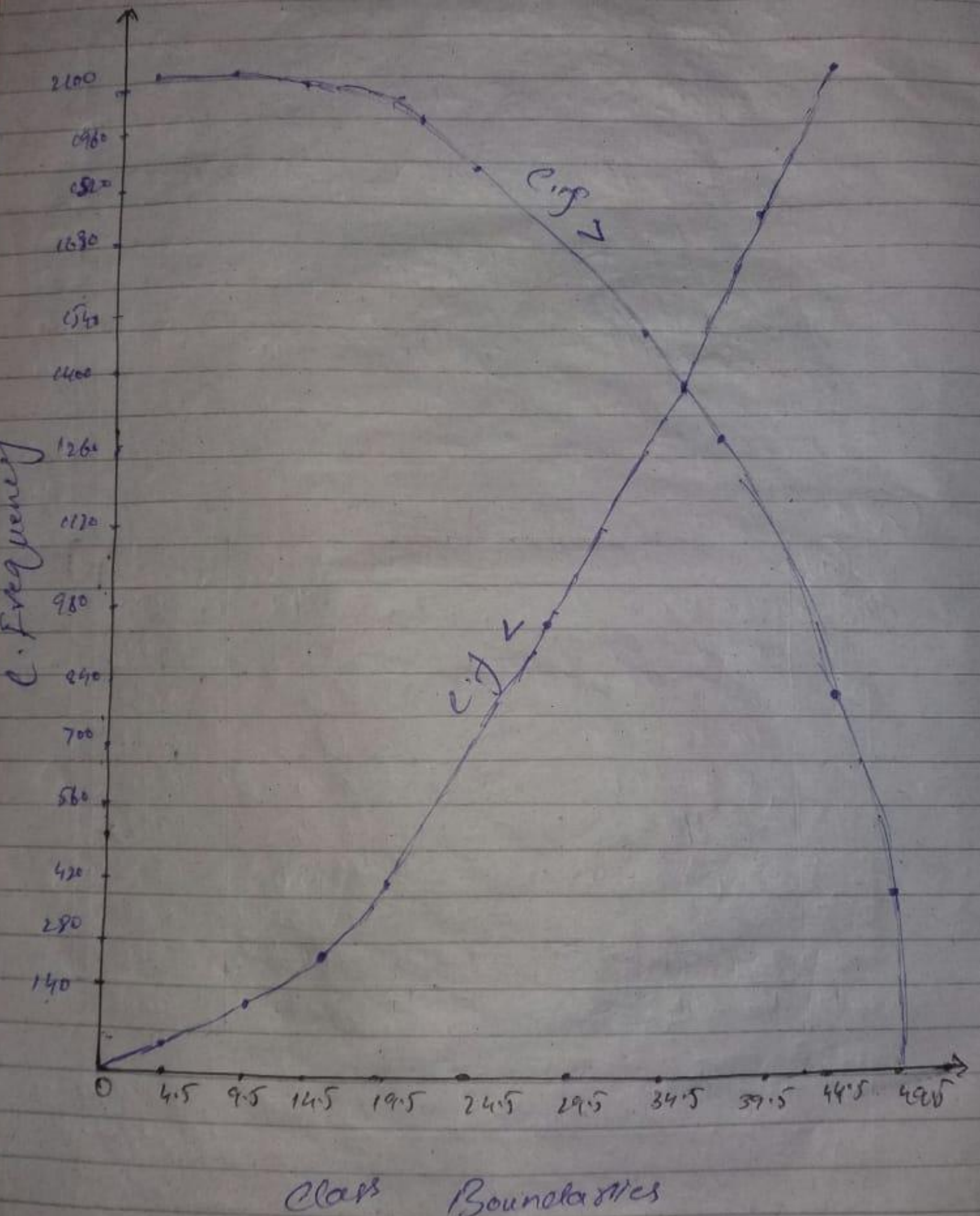

Ans (b)

5

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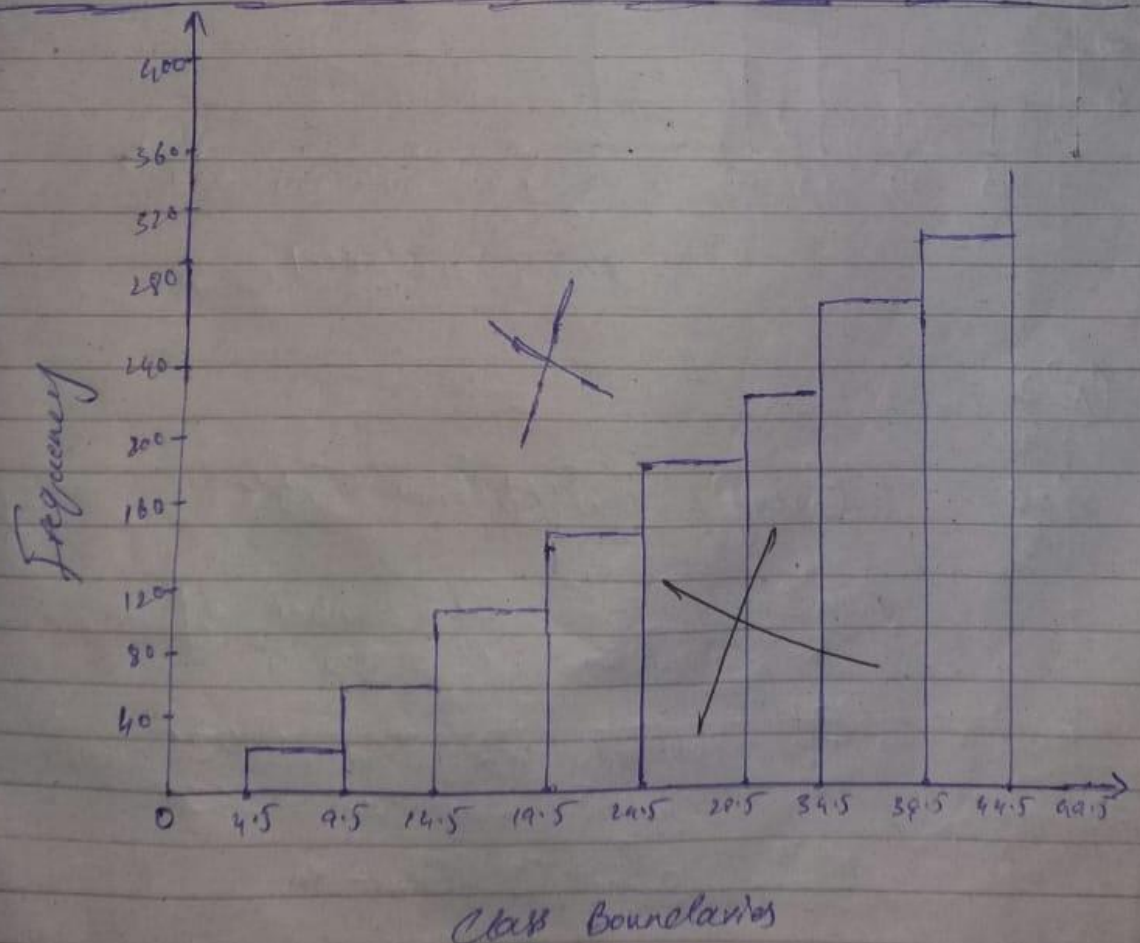
class interval	Frequency	Class Boundaries
0 - 4	25	-0.5 - 4.5
5 - 9	45	4.5 - 9.5
~~5 - 9~~		
10 - 14	81	9.5 - 14.5
15 - 19	143	14.5 - 19.5
20 - 24	280	19.5 - 24.5
25 - 29	349	24.5 - 29.5
30 - 34	374	29.5 - 34.5
35 - 39	395	34.5 - 39.5
40 - 44	400	39.5 - 44.5

See your Next Page



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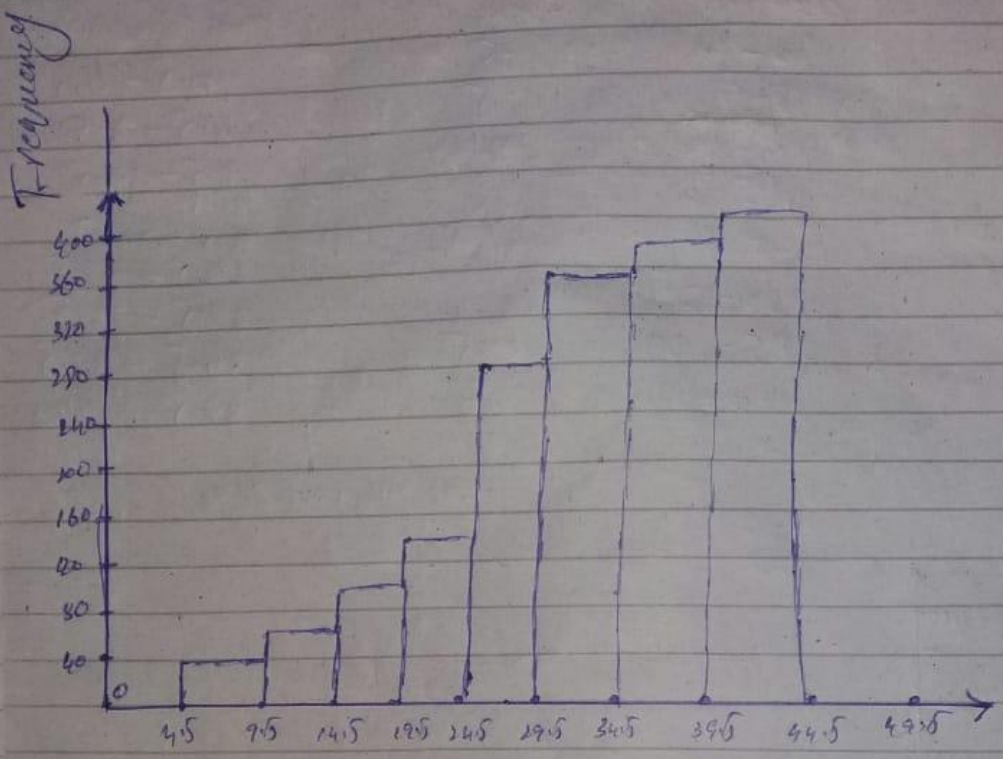

Q 2.
5

Ans
5

Group Distribution Table

Step 1
5 Count the number of observation N = 30

Step 2
5 Largest value x_m = 431
Smallest value x_0 = 363

Step 3
5 Range; $R = x_m - x_0$
$= 431 - 363$
$R = 68$

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Step 4

$K = 1 + 3.33 \log N$

$K = 1 + 3.33 \log(30)$

$K = 1 + 3.33 (1.477)$

$K = 1 + 4.92$

$K = 5.92$

$\boxed{K = 6}$ (rounding off)

Step 5

$h = R/K$

$= 68/6$

$h = 11.33$

$h = 12$ (By rounding)

Classes	Frequency
363 – 374	4
375 – 386	4
387 – 398	8
399 – 410	7
411 – 422	4
423 – 434	3

By Tally column

(2)

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Classes	class Boundaries	class mark	Frequency (f)	C.F	Tally
363 - 374	362.5 - 374.5	368.5	4	4	IIII
375 - 386	374.5 - 386.5	380.5	4	8	IIII
387 - 398	386.5 - 398.5	392.5	8	16	IIII III
399 - 410	398.5 - 410.5	404.5	7	23	IIII II
411 - 422	410.5 - 422.5	416.5	4	27	IIII
423 - 434	422.5 - 434.5	428.5	3	30	III

Mean :-

$$\bar{x} = \frac{423 + 369 + 387 + 411 + 393 + 394 + 371 + 377 + 389 + 409 + 392 + 408 + 431 + 401 + 383 + 391 + 405 + 382 + 400 + 381 + 399 + 415 + 428 + 422 + 396 + 372 + 410 + 419 + 386 + 390}{30}$$

$$\bar{x} = \frac{11914}{30}$$

$$\boxed{\bar{x} = 397}$$

Mode :-

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

Here $l = 387$, $f_m = 8$

$f_1 = 4$, $f_2 = 7$

$h = 12$

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$$\text{Mode} = 387 + \frac{8-4}{(8-4)+(8-7)} \times 12$$

$$\text{Mode} = 387 + \frac{4}{4+1} \times 12$$

$$= 387 + \frac{4}{5} \times 12$$

$$= 387 + \frac{48}{5}$$

$$= 387 + 9.6$$

$$= 396.6$$

$$\boxed{\text{Mode} = 397}$$

Quartile

$$Q_1 = \frac{n}{4} = \frac{30}{4}$$

$$\boxed{Q_1 = 7.5}$$

Corresponding to value in class 375 - 386 Therefore

$$Q_1 = l + \frac{i}{f}\left(\frac{n}{4} - C\right)$$

$$= 375 + \frac{12}{4}(7.5 - 4) \quad \boxed{C = 4}$$

$$= 375 + 3(3.5)$$

$$= 375 + 10.5$$

$$= 385.5$$

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$Q_1 = 386$

Now

$Q_3 = \frac{3n}{4} = \frac{3 \times 30}{4}$

$= \frac{90}{4} = 22.5$

which correspond to value in class 399-410

Therefore

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

$= 399 + \frac{12}{7}(22.5 - 16)$

$= 399 + \frac{12}{7}(6.5)$

$399 + \frac{78}{7}$

$= 399 + 11$

$Q_3 = 410$

Q3
5

Ans (c) Sol
5

3, 6, 2, 1, 7, 5

$Mean = \frac{3+6+2+1+7+5}{6}$

$= \frac{24}{6}$ $\quad Mean = 4$

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x	x^2
8	9
6	36
2	4
1	1
7	49
5	25
$\Sigma = 24$	$\Sigma = 124$

S.Deviation $= \sqrt{\frac{\Sigma x^2}{N} - \left(\frac{\Sigma x}{N}\right)^2}$

$S.D = \sqrt{\frac{124}{6} - \frac{521}{36}}$

$S.D = \sqrt{\frac{168}{36}}$

$S.D = \sqrt{4.7}$

$\boxed{S.D = 2.2}$

Second Data ki

$Mean = \frac{11+17+9+7+19+15}{6}$

$Mean = \frac{78}{6}$

$\boxed{Mean = 13}$

$S.D = \sqrt{\frac{\Sigma x^2}{N} - \left(\frac{\Sigma x}{N}\right)^2}$

x	x^2
11	121
17	289
9	81
7	49
19	361
15	225
$\Sigma = 78$	$\Sigma = 1126$

$S.D = \sqrt{\frac{1126}{6} - \frac{6084}{36}}$

$S.D = \sqrt{\frac{6756 - 6084}{36}}$

$S.D = \sqrt{\frac{672}{36}}$

$S.D = \sqrt{18.7}$

$\boxed{S.D = 4.3}$

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1st data Mean = 4
1st data S.D = 2.2
second data Mean = 13
2nd data S.D = 4.3

The required relation is that

Mean of second data is greater than mean of 1st data and is double the standard derivation of 1st data.

Q5

Ans 5 (b) or Comment es No it is not obviously that all the people have height 5 feet can easily cross it. If he/she is not know swiming and river is not deep uniformly it is 2 feet at some parts while 7 feet on other points so he will cross it.

Ans 5 (b) No it does not mean every student is hopeless. Those student whose marks are less than 30 some have 30 marks and some student have greater than 30 marks. There can be few student whose marks may be 60 and or more.

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Ans 5 (i) No it is not true. Not all the household servent must be paied. Average pay does not mean everyone get paied same the king income must be much more than servant

Q4

Ans 5

Classes	f_i	x	x^2	$f_i x$	$f_i x^2$
64 – 84	15	74	5476	1110	82140
85 – 104	18	94.5	8930.25	1701	160744.5
105 – 124	27	114.5	13110.25	3091.5	353976.75
125 – 144	10	134.5	18090.25	1345	180902.5
145 – 164	6	154.5	23870.25	927	143221.5
165 – 184	5	174.5	30450.25	872.5	152251.25
185 – 204	13	194.5	37830.25	2528.5	491793.29
	$\Sigma = 94$			$\Sigma = 11575.5$	$\Sigma = 1565029.75$

Variable eq

$$s^2 = \frac{\Sigma f_i x^2}{n} - \left(\frac{\Sigma f_i x}{n}\right)^2$$

$$= \frac{1565029.75}{94} - \left(\frac{1157.5}{94}\right)^2$$

$$= 16649.26 - 15164.35$$

$$= 1484.9$$

$$\boxed{s^2 = 1485}$$

(12)

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Standard Deviation or

Taking square root of variance S^2

we have

$$\sqrt{S^2} = \sqrt{1485}$$

$$\boxed{S = 38.5}$$