

Name

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Subject

probability &  
Statistics

Submit To

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# probability & Statistics

Q.No	class intervals	frequency	class boundaries	cf <	cf >
1	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	775
	40-44	400	39.5-44.5	2092	400

C.B =  $\Delta = \text{LCL of 2nd class} - \text{UCL of 1st class}$

$$C.B = 5 - 4$$

$$C.B = 1$$

$$C.B = \frac{\Delta}{2} = \frac{1}{2}$$

$$C.B = 0.5$$

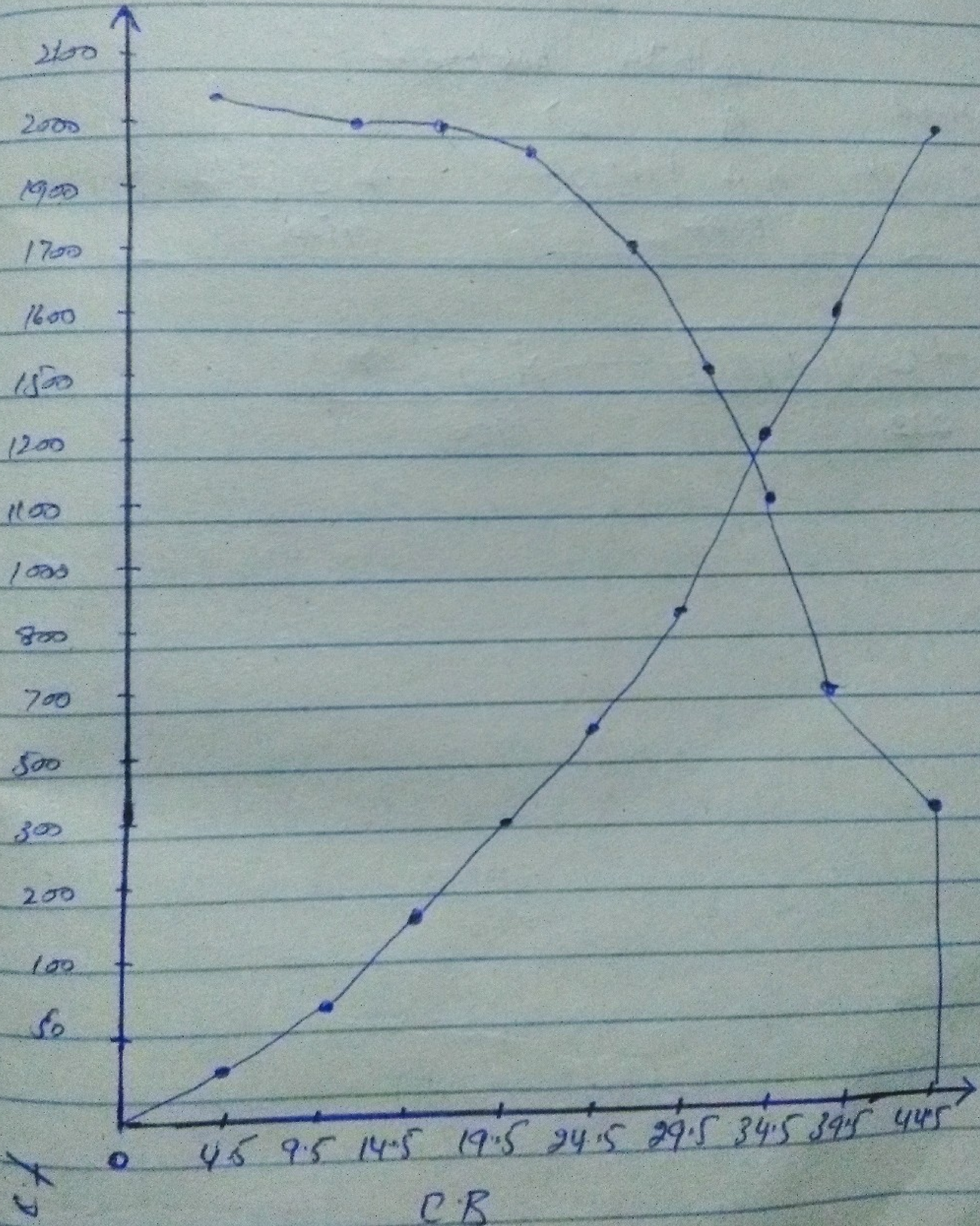


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Q No 1  
(a)





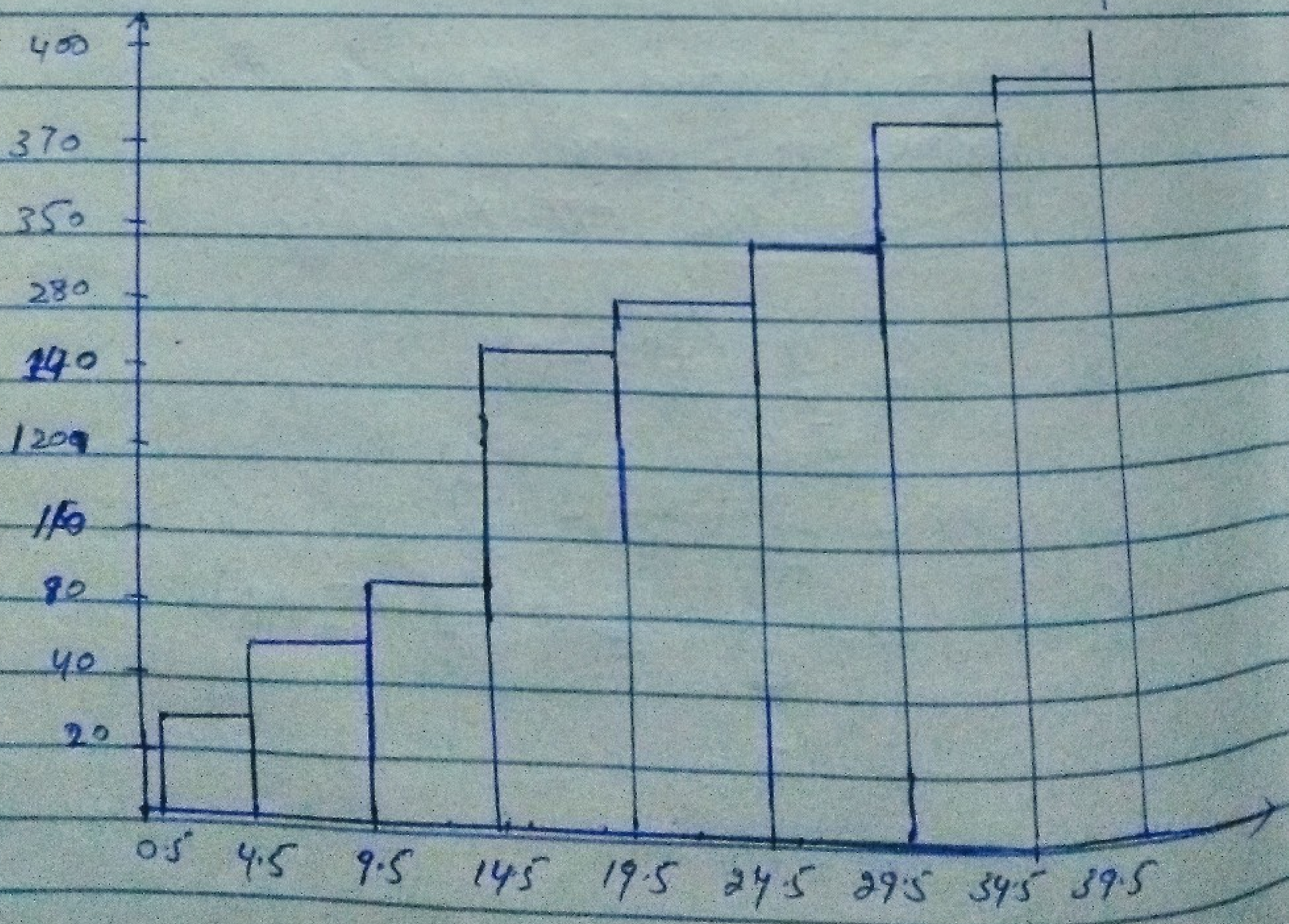
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Q No 1

(b)	class intervals	frequency	class Boundaries
	0-4	25	- 0.5 - 4.5
	5-9	45	4.5 - 9.5
	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





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Q No 2

Step 1 The Number of observation  
 $N = 30$

Step 2 largest value  $X_m = 431$   
 Smallest value  $X_o = 363$

Step 3 Range;  $R = X_m - X_o$   
 $431 - 363 = 68$

So  $R = 68$

Step 4 find  $k$   $k = 1 + 3.33 \log(N)$

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

$$k = 1 + 3.33 (1.477)$$

$$k = 1 + 4.92$$

$$k = 5.92$$

$$k = 6$$

Step 5  $h = R/k \Rightarrow 68/6$

$$h = 11.33$$

$$h = 12 \text{ (by Rounding)}$$



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classes	frequency
363 - 374	4
374 - 386	4
387 - 398	8
399 - 410	7
411 - 422	4
423 - 434	3

Mean:-

$$\bar{x} = \frac{\text{Sum of observation}}{N}$$

$$\begin{aligned} \bar{x} = & 423 + 369 + 387 + 411 + 393 + 394 + 371 \\ & + 377 + 389 + 409 + 392 + 408 + 431 + 401 + \\ & 363 + 391 + 405 + 382 + 400 + 381 + 399 \\ & + 415 + 428 + 422 + 396 + 372 + 410 + 419 \\ & + 386 + 390 \\ & \hline & 30 \end{aligned}$$

$$\frac{\cancel{11914}}{30} = 11914$$

$\bar{x} = 397$



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Mode:-

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

Here  $l = 387$

$$f_m = 8, f_1 = 4, f_2 = 7$$

$$h = 12$$

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

$$\text{mode} = 387 + \frac{4}{8(4+1)} \times 12$$

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

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

$$\text{mode} = 387 + 9.6$$

$$\text{mode} = 387 + 9.6$$

$$\text{mode} = 396.6$$

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

Quartiles:-  $Q_1 = \frac{n}{4} = \frac{30}{4}$

$$Q_1 = 7.5$$

which is correspond to values in class

$$375 - 386$$

That's why



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$$Q_2 = l + \frac{h}{f} \left( \frac{n}{4} - c \right)$$

$$Q_2 = 375 + \frac{12}{4} (7.5 - 4) !!$$

$$c = 4$$

$$Q_1 = 375 + 3(3.5)$$

$$Q_2 = 375 + 10.5$$

$$Q_1 = 385.5$$

$$Q_2 = 386$$

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

$$Q_3 = \frac{90}{4} = 22.5$$

which is again corresponds to  
value in class

399 - 410 That's why.

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

$$Q = 399 + \frac{12}{7} \left( \frac{3n}{4} - c \right)$$

$$Q_3 = 399 + \frac{12}{7} (22.5 - 16)$$

$$c = 16$$



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$$Q_3 = 399 + \frac{12}{7} (6.5)$$

$$Q_3 = 399 + \frac{78}{7}$$

$$Q_3 = 399 + 11$$

$$Q_3 = 410$$



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Q No 3

first given Data is:-

3, 6, 2, 1, 7, 5

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

$$\text{Mean} = \frac{24}{6} \Rightarrow \bar{x} = 4$$

$x$	$x^2$
3	9
6	36
2	4
1	1
7	49
5	25
$\Sigma = 24$	$\Sigma = 124$

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

$$S.D = \sqrt{\frac{124}{6} - \frac{576}{36}}$$

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

$$S.D = \sqrt{4.7}$$

$$S.D = 2.2$$



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Second given Data is

11, 17, 9, 7, 19, 15

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

$$\text{Mean} = \frac{78}{6} \Rightarrow 13$$

$$\boxed{\text{Mean} = 13}$$

X	X <sup>2</sup>	S.D = $\sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2}$
11	121	$\text{S.D} = \sqrt{\frac{1126}{6} - \frac{6084}{36}}$ $\text{S.D} = \sqrt{\frac{6756}{36} - \frac{6084}{36}}$ $\text{S.D} = \sqrt{\frac{672}{36}}$
17	289	
9	81	
19	49	
7	361	
15	225	
$\Sigma = 78$	$\Sigma = 1126$	

$$\text{S.D} = \sqrt{18.7}$$

$$\boxed{\text{S.D} = 4.3}$$

So the difference b/w Means and S.D is the mean of 2nd Data is greater than 1st Mean and the S.D of 2nd is also greater than 1st also called double.



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Solution

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	491793.75
	$\Sigma = 94$			$\Sigma = 11575.5$	$\Sigma = 1565029.75$

Variance:-

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

$$s^2 = \frac{1565029.75}{94} - \left( \frac{11575.5}{94} \right)^2$$

$$s^2 = 16649.26 - 15164.35$$

$$s^2 = 1484.9$$

So  $s^2 = 1485$

Standard deviation is  $s^2 = 1485$

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

$$s = 38.5$$



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Q no 5

- (a) No, because Here the average of depth is 5 feet and its depthly on point like, 2, 7, 5 etc on first point can but on average can't and also may some one can't swim.
- (b) The news is bad because average is so less but its doesn't mean that every student is hopeless. Some of student may got 80% and above. indeed who is not satisfied from his/her paper then she/he will be worry.
- (c) it's not true that King and household Servants must be paid equal. The King will pay more than Servants and may be some of Servants don't paid.