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Subject: STATISTICAL

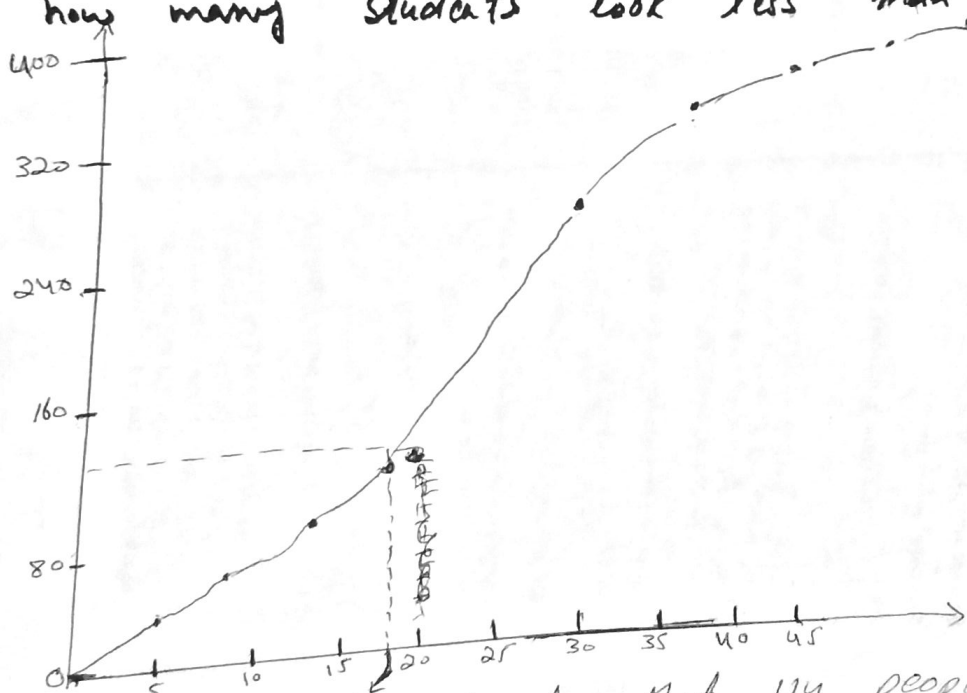
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Time taken (in minutes)	<5	<10	<15	<20	<25	<30	<35	<40	<45
frequency	25	45	81	143	280	349	374	395	400

- Draw a cumulative frequency curve and estimate how many students took less than 18 minutes.



from graph we estimate that 114 peoples took less than 18 minutes.

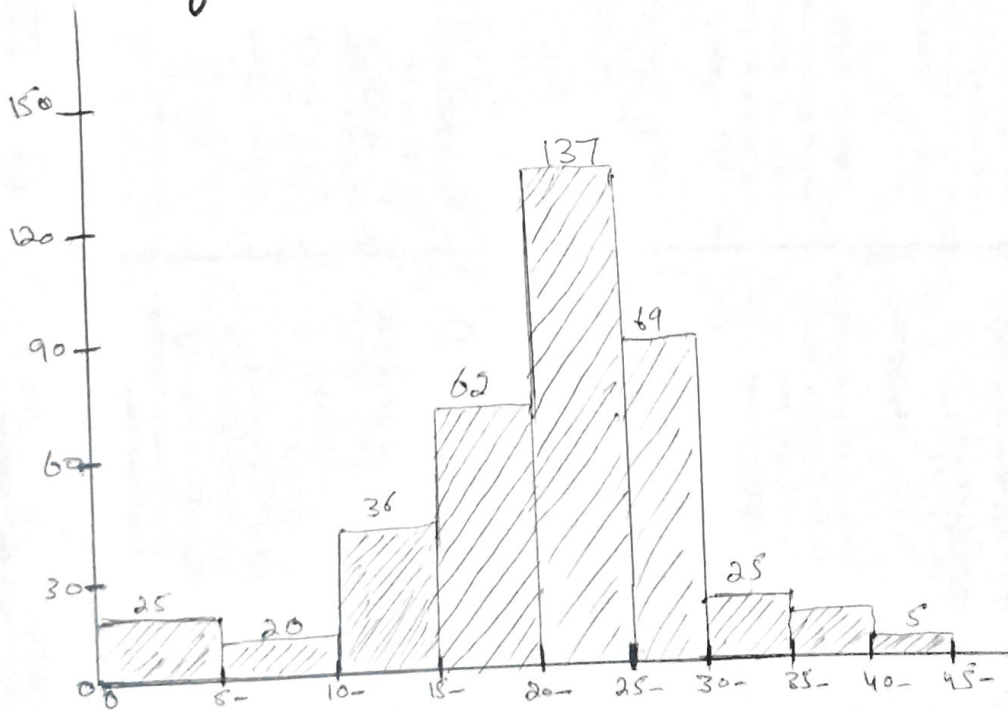
- Take equal class intervals of 0-5-10-etc, construct frequency distribution and draw a histogram.

P.T.O.

(2)

Ucb	F	Time (min)	frequency
5	25	0-	25
10	45	5-	$45 - 25 = 20$
15	81	10-	$81 - 45 = 36$
20	143	15-	$143 - 81 = 62$
25	280	20-	$280 - 143 = 137$
30	349	25-	$349 - 280 = 69$
35	374	30-	$374 - 349 = 25$
40	395	35-	$395 - 374 = 21$
45	400	40-45	$400 - 395 = 5$

Histogram is .



Q3 By multiplying each of the numbers 3, 6, 2, 1, 7, 5 by 2 and then adding 5, we get 11, 17, 9, 7, 19, 15. What is the relation between the standard deviation and the means of the two sets.

Ans

$$\bar{x} = \frac{\sum x}{n} = \frac{24}{6} = 4$$

	$x$	$x - \bar{x}$	$(x - \bar{x})^2$
	3	-1	1
	6	2	4
	2	-2	4
	1	-3	9
	7	3	9
	5	1	1
$\sum$	24	.....	28

$$S_x = \sqrt{\frac{\sum (x - \bar{x})^2}{n}} = \sqrt{\frac{28}{6}}$$

$$= \sqrt{4.6667} = 2.16$$

Now  $x = 2x + 5$  Then

P.T.O

(4)

	Y	Y - $\bar{Y}$	(Y - $\bar{Y}$ ) <sup>2</sup>
	11	-2	4
	17	4	16
	9	-4	16
	7	-6	36
	19	6	36
	15	2	4
$\Sigma$	78	...	112

$$\bar{Y} = \frac{\Sigma Y}{n} = \frac{78}{6} = 13$$

$$= 2(4) + 5 = 2\bar{x} + 5 \quad \text{and}$$

$$S_y = \sqrt{\frac{\Sigma (Y - \bar{Y})^2}{n}} = \sqrt{\frac{112}{6}} = \sqrt{18.6667}$$

$$= 4.32$$

$$= 2(2.16) = 2 \quad S_x = 2$$



Q4 For the following grouped distribution table calculate the variance and standard deviation.

Class	64-84	85-104	105-124	125-144	145-164	165-184	185-204
frequency	15	18	27	10	6	5	13

P.T.O.

Grade	F	x	$\bar{x}$	(x - $\bar{x}$ )	(x - $\bar{x}$ ) <sup>2</sup>	f(x - $\bar{x}$ ) <sup>2</sup>
64-84	15	74	123.14	-49.14	2414.7	36220.5
85-104	18	94.5	123.14	-28.64	820.2	14783.6
105-124	27	114.5	123.14	-8.64	74.6	2014.2
125-144	10	134.5	123.14	11.36	129.0	1290
145-164	6	154.5	123.14	31.36	983.4	5900.4
165-184	5	174.5	123.14	51.36	2637.8	13189
185-204	13	194.5	123.14	71.36	5092.2	66198.6
Total	94					139576.3

for  $\bar{x} = \frac{\sum fx}{\sum f} = (15)(74) + (18)(94.5) + (27)(114.5) + (10)(134.5) + (6)(154.5) + 5(174.5) + (13)(194.5)$

$$= 1110 + 1701 + 3091.5 + 1345 + 927 + 872.5 + 2528.5$$

$$\bar{x} = \frac{11575.5}{94} = 123.14$$

$$\bar{x} = 123.14$$

Formula  $S^2 = \frac{\sum f(x - \bar{x})^2}{n}$

put in formula.

$$S^2 = \frac{139576.3}{94} = 1484 \text{ (variance)}$$

now taking square root on both sides.

$$\sqrt{S^2} = \sqrt{1484} = 38.5 \text{ (standard deviation)}$$



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Q2 Construct a grouped distribution table for the following data and calculate Mean, Mode and quartiles.

423, 369, 387, 411, 393, 374, 371, 377, 381, 409, 392, 408, 431, 401, 363, 391, 405, 382, 400, 381, 399, 415, 428, 422, 396, 372, 410, 419, 386, 390.

n = 30

grouped marks	F	Mid point	F.M	C.f
363 - 377	4	370	1480	4
377 - 391	7	384	2688	11
391 - 405	8	398	3184	19
405 - 419	6	412	2472	25
419 - 433	5	426	2130	30
Total	30		11954	

$$\text{Mean} = \frac{\sum f.M}{\sum f}$$

$$= \frac{11954}{30}$$

Mean = 398.4

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

l = 391, f<sub>1</sub> = 7, f<sub>2</sub> = 6, f<sub>m</sub> = 8

$$\text{mode} = 391 + \frac{8-7}{(8-7) + (8-6)} \times 14$$

(6)

$$391 + \frac{1}{1+2} \times 14$$

(7)

$$\text{mode} = 395.6$$

Quartile

$$l = 377, h = 14, F = 7$$

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

$$Q_1 = 377 + \frac{14}{7} (7.5 - 4)$$

$$Q_1 = 377 + 2(3.5)$$

$$Q_1 = 377 + 7$$

$$Q_1 = 384$$

Now

$$Q_3 = l + \frac{h}{F} \left( \frac{n}{2} - C \right)$$

$$= 405 + \frac{14}{6} (22.5 - 19)$$

$$= 405 + \frac{14}{6} (3.5)$$

$$= 405 + 8.165$$

$$Q_3 = 413$$

Q5

1- Ans No all people can not cross the river as the can have depth more then 5 feet. But same might make it.

Ans 2

No, not every student should be hopeless because 30 ~~class~~ is ~~more~~ let us assume class has 20 students. Half of

P.T.O



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them obtained 48 marks and other half is 15 marks the average would be 30 but (50%) of students can pass. principle of mean.



Q5 - Ans 3

The House hold servants one not paid fabulously as 20000 is mean value. It distribution which can be effected by extreme value.

