Class 10-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

Chapter 21

MEASURES OF CENTRAL TENDENCY

Median and Quartiles

Median is the central value of a statistical data if it is arranged in ascending or descending order.

Quartiles are values of a statistical data which divides the whole set of observations into four equal parts.



<u>Mode</u>

Mode of a statistical data is the variate which has the maximum frequency.

Modal class is a class with maximum frequency.

Empirical Relation :Mode=3 median - 2 mean

Exercise 21.2

Q11. Solution:

Variate	Frequency	Cumulative		
		Frequency		
15	4	4		
18	6	10		
20	8	18		
22	9	27		
25	7	34		
27	8	42		
30	6	48		

n = 48(Even)

i) M	edian =	$\frac{\frac{n}{2}th\ observation + \frac{n+1}{2}th\ observation}{2}$
		24th observation+25th observation
		2
	=	22+22
		2
	=	22 (From 19^{th} to 27^{th} each observation = 22)
ii) Lowe	er quartile Q ₁ =	$\frac{n}{4}$ th observation
	=	12 th observation
	=	20 (From 10^{th} to 18^{th} each observation = 20
iii) Uppe	er quartile Q ₃ =	$\frac{3n}{4}$ th observation
	=	36 th observation

= 20 (From 34^{th} to 42^{th} each observation = 27

iv) Inter quartile range =
$$Q_3 - Q_1$$

= $27-20$ = 7

Exercise 21.3

Q11. Solution:

Score	No. of scores	Cumulative	$f_i x_i$
(x _i)	(Frequency)(f _i)	frequency	
0	0	0	0
1	3	3	3
2	6	9	12
3	4	13	12
4	7	20	28
5	5	25	25

 $n = 25(odd) \Sigma f_i x_i = 80$

i)	Modal score	=	4 (With ma	aximum frequency 7)		
ii)	Median score	=	$\frac{n+1}{2}$ th observation			
		=	13 th observ	vation		
	~~	=	3			
iii)	Total score	=	$\Sigma f_i x_i$	=80		
iv)	Mean score	=	$\frac{\Sigma fixi}{\Sigma fi} = \frac{80}{25}$	=3.2		

Exercise 21.4(Use graph paper for this exercise)

Wt. in Kg	40-44	45-49	50-54	55-59	60-64	65-69
No.of students	2	8	12	10	6	4

Q7. Draw a histogram and estimate the modal weight.

Convert the discontinuous distribution in to continuous.

Adjustment factor = $\frac{45-44}{2}$ = 0.5

Adjust the class limits by subtracting 0.5 from the lower limits and adding 0.5 to the upper limits.



Classes after adjustment

Convert the mid values into continuous class intervals.

Size of each class = 6

6÷2 = 3

Class limits are 12-3 and 12+3, 18-3 and 18+3, etc..

Class intervals	9-15	15-21	21-27	27-33	33-39	39-45	45-54
Frequency	20	12	8	24	16	8	12

Now draw the histogram and estimate the mode.



Mode = 30.5

Modal class = 27 - 33

Home Work:

- Solve Exercise 21.2 Questions 4, 5, 6, 8 and 12
- Solve Exercise 21.3 Questions 4, 5, 8, 9, 12 and 13 In the Maths copy
- Solve Exercise 21.4 Questions 1, 3, and 5
- Practise exercise 21.2, 21.3, 21.4 all problems.