

CLASS: 8 . MATH ACTIVITY NO.: 1 MEDIAN OF A C.F DISTRIBUTION

OBJECTIVE: To find the median of a given cumulative frequency table by graphical method and verify the answer by actual calculation of the median.

DESIGN AND OR APPROACH TO THE ACTIVITY:

- 1) Plotting an ogive (Less than type or More than type) for the given data on the graph.
- 2) Formula for calculating the median.
- 3) Significance of the median.

PROCEDURE: 1) Consider the cumulative frequency distribution given in table I.

2) The values 10, 20, 30, ..., 100 are the upper limits of the respective class intervals.

3) Mark the upper limits on the x-axis and the corresponding cumulative frequencies on the y-axis, choosing a convenient scale (which may or may not be the same for both the axes).

4) Now, plot the points corresponding to the ordered pairs given by (upper limit, corresponding cumulative frequency), i.e., (10, 5), (20, 8), (30, 12), (40, 15), (50, 18), (60, 22), (70, 29), (80, 38), (90, 45), (100, 53) on the graph paper and join them by free hand smooth curve. This curve is called a CUMULATIVE FREQUENCY CURVE OR AN OGIVE (of the Less than type). (Fig I)

5) Locate $\frac{N}{2} = \frac{53}{2} = 26.5$ on the y-axis. From this point, draw a perpendicular to the x-axis. The point of intersection of this perpendicular with the x-axis is the median of the data.

6) Calculate the median of the data using the formula:-
Median = $l + \frac{(N/2 - c.f.) \times h}{f}$. [Using extended Table I]

Since the c.f. just ^fgreater than 26.5 is 29, the corresponding class interval 60-70 is the required median class
 $\Rightarrow l = 60, h = 10, f = 7, c.f. = 22$.

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$$\text{Thus, median} = 60 + \frac{(26.5 - 22) \times 10}{7} = 60 + \frac{4.5 \times 10}{7}$$

$$= 60 + \frac{45}{7} = 60 + 6.43 \approx 66.43$$

$\therefore$, the median marks of these students are 66.43 (approx)

RESULT: It can be seen that the median of the given data obtained by the graphical method is approximately the same as the calculated median. Hence Verified.

Marks Obtained	Number of Students (c.f.)	TABLE I	Marks C.I.	Number of students (f)
Less than 10	5	EXTENDED TABLE I	0-10	5
Less than 20	8		10-20	3
Less than 30	12		20-30	4
Less than 40	15		30-40	3
Less than 50	18		40-50	3
Less than 60	22		50-60	4
Less than 70	29		60-70	7
Less than 80	38		70-80	9
Less than 90	45		80-90	7
Less than 100	53		90-100	8

