

Mean

The MEAN of a data set is statistical term for “arithmetic average”

How to get the MEAN:

$$\text{mean} = \frac{\text{the sum of all data values}}{\text{the number of data values}}$$

The symbol Σ denotes a “summation” of data.

$$\text{or } \bar{x} = \frac{\sum x}{n} \text{ where } \sum x \text{ is the sum of the data}$$

Mode

The MODE is the frequently occurring value in the data set.

Median

The MEDIAN is the middle value of an ordered data set.

How to get the MEDIAN:

Arrange the data in ascending (or descending) order

Median

If there are n data values, find the value of $\frac{n+1}{2}$.
The median is the $\left(\frac{n+1}{2}\right)$ th data value.

Note: For an **odd number** of data, the median is one of the data.
For an **even number** of data, the median is the average of the two middle values and may not be one of the original data.

For example:

If $n = 13$, $\frac{13+1}{2} = 7$, so the median = 7th ordered data value.

If $n = 14$, $\frac{14+1}{2} = 7.5$, so the median = average of 7th and 8th ordered data values.

Find the median of the ff. set of numbers:

20, 15, 12, 17, 32, 15, 25

Arrange the data in ascending (or descending) order

12, 15, 15, 17, 20, 25, 32

Middle Position: $\frac{n+1}{2} = \frac{7+1}{2} = 4\text{th position}$

Median: 17

FINDING THE MODE OF DATA IN TABULAR FORM

EXAMPLE 1

The ff. table shows the distribution heights of 15 students. Find the **MODE**.

Height (cm)	152	154	156	158	160
No. of Students	2	1	3	2	7

What is the mode of the given data?

Mode of distribution: 160cm

FINDING THE MEDIAN & MEAN of DATA IN TABULAR FORM

EXAMPLE 1

The ff. table shows the distribution heights of 15 students. Find the **MEDIAN** height.

Height (cm)	152	154	156	158	160
No. of Students	2	1	3	2	7

Middle Position: $\frac{n+1}{2} = \frac{15+1}{2} = 8\text{th position}$

Finding the 8th value from the frequency table, we have **median height = 158cm**

EXAMPLE 1

The ff. table shows the distribution heights of 15 students. Find the **MEAN** height.

Height (cm)	152	154	156	158	160
No. of Students	2	1	3	2	7

Mean:

$$\frac{2362}{15} = 157.47$$

Data	Frequency	Total
152	2	304
154	1	154
156	3	468
158	2	316
160	7	1120
TOTAL		2362

FINDING MEAN OF GROUPED DATA

The table shows the number of a popular magazine sold to customers in different shops for the month of July.

Estimate the mean of the distribution.

No. of mags sold	Mid-value x	Frequency f	fx
70 - 74	72	4	288
75 - 79	77	11	847
80 - 84	82	15	1230
85 - 89	87	24	2088
90 - 94	92	18	1656
95 - 99	97	9	873
100 - 104	77	3	306
		84	7288

$\Sigma f \rightarrow \Sigma fx$

$70 + 74 = 72$
2

MEAN (grouped data)


$$\bar{x} = \frac{\Sigma fx}{\Sigma f} = \frac{7288}{84}$$

MEAN = 86.8

FINDING MEDIAN OF GROUPED DATA

EXAMPLE 1

Eighty randomly selected lightbulbs were tested to determine their lifetimes (in hours). The following frequency distribution was obtained.



Determine the median lifetimes (in hours) of these bulbs.

Make a column for the cumulative frequency.

Lifetime	Frequency	Cumulative Frequency
52.5 - 63.5	6	6
63.5 - 74.5	12	18
74.5 - 85.5	25	43
85.5 - 96.5	18	61
96.5 - 107.5	14	75
107.8 - 118.5	5	80

gives a running total of the scores up to a particular value

EXAMPLE 1

Lifetime	Frequency	Cumulative Frequency
52.5 - 63.5	6	6
63.5 - 74.5	12	18
74.5 - 85.5	25	43
85.5 - 96.5	18	61
96.5 - 107.5	14	75
107.8 - 118.5	5	80

Find the position of the median or the median class.

median class

From the $n=80$, get the halfway point:

$$\frac{n}{2} = \frac{80}{2} = 40 \quad \because 40 < 43$$

EXAMPLE 1

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63.5 - 74.5	12	18
74.5 - 85.5	25	43
85.5 - 96.5	18	61
96.5 - 107.5	14	75
107.8 - 118.5	5	80

$$\text{median} = \left(\frac{\frac{n}{2} - cf}{F} \right) (w) + L_{md}$$

What is the width of the class interval?

What is a lower boundary?

cf = cf BEFORE the median class

F = frequency of the median class

w = width of the class interval

L_{md} = lower boundary of the median class

EXAMPLE 1

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What is the width of the class interval? difference between 2 consecutive lower class limits

What is a lower boundary? boundaries can be determine by adding or subtracting 0.5 from the upper or lower class limits.

EXAMPLE 1

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$$\text{median} = \left(\frac{\frac{n}{2} - cf}{F} \right) (w) + L_{md}$$

MEDIAN = ?

cf = cf BEFORE the median class

F = frequency of the median class

w = width of the class interval

L_{md} = lower boundary of the median class