EXPERT GUIDANCE

GCSE MATHS

MEAN, MEDIAN, MODE AND RANGE

- What is Mean, Median, Mode and Range
- How to Calculate Mean, Median, Mode and Range
- Mean, Mode and Median from the Frequency Table
- Mean, Mode and Median from the Grouped Data
- Comparison of the Data
- Word Problems

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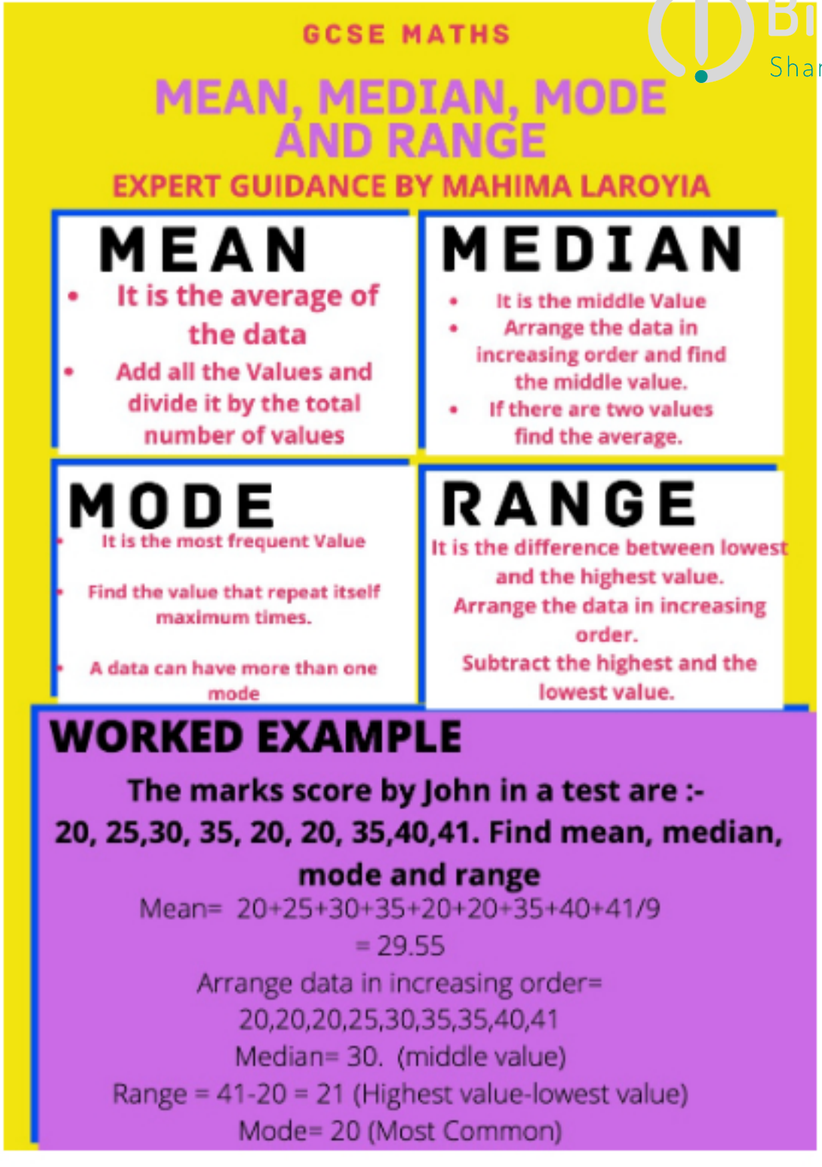

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MEAN

Mean, Median and Mode are the different types of averages.

Mean, Median and Mode are used for Data Comparisons.

Mean, Median and Mode are also known as '
' MEASURES OF CENTRAL TENDENCY"

Range is the measure of the spread of the data

Mean is the better of all averages as it uses the whole data. It is the best way to analyse a group of data.

But, the mean is affected by outliers. So if a data have values closer to each other mean is the best and if it has outliers then mode and median are the best for comparison

How to Calculate mean?

a) Add up all the values

b) Divide the sum obtained in the first step with the number of data values.

The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41.

$$\text{Mean} = \frac{20+25+30+35+20+20+35+40+41}{9}$$

$$= 29.55$$

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It is the middle value of the data

Not affected by outliers but it does not use all the data points

Start striking number from each end. If you are left with one number then it is a median, if two numbers then take the average.

To Calculate ~~mean~~ :-

a) Arrange the data in the increasing order.

b) Find the middle number.

c) If there are two middle numbers then take the average

Q1 The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41.
Find median

Arrange data in increasing order=
20,20,20,25,30,35,35,40,41

Way 1:
Way 2

$\frac{10}{2}$ = 5th value

30

WAY 2

Find n=number of data sets

Find $\frac{n+1}{2}$

If whole number than that data will be median
If decimal than take average

Q2 The marks scored by David in a test are :
10,15,15,15,20,22,24,25

Median Way 1
Median Way 2:

$\frac{9+1}{2} = 5$

$\frac{15+20}{2} = \frac{35}{2} = 17.5$

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MEDIAN

It is the middle value of the data

Not affected by outliers but it does not use all the data points

To Calculate mean :-

a) Arrange the data in the increasing order.

b) Find the middle number.

c) If there are two middle numbers then take the average

WAY 1

Start striking number from each end. If you are left with one number then it is a median, if two numbers then take the average.

WAY 2

Find n=number of data sets

Find $\frac{n+1}{2}$

If whole number than that data will be median
If decimal than take average

Q1 The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41.
Find median

Arrange data in increasing order=
20,20,20,25,30,35,35,40,41

Way 1: 20,20,20,25,30,35,35,40,41
Way 2 $\frac{9+1}{2} = 5^{th}$ number

Q2 The marks scored by David in a test are :
10,15,15,15,20,22,24,25

Median Way 1
Median Way 2: $\frac{8+1}{2} = \frac{9}{2} = 4.5 \left(\frac{15+20}{2}\right) = 17.5$

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MODE

It is the most frequent Value

Find the value that repeats itself maximum times.

A data can have more than one mode

Not affected by outliers but it does not use all the data points

The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41. Find the mode

Mode= 20 (Most Common)

Q2 The marks scored by David in a test are :
10,15,15,15,20,22,24

Mode:

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Find the value that repeats itself maximum times.

A data can have more than one mode

The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41. Find the mode

Mode= 20 (Most Common)

Q2 The marks scored by David in a test are :
10,15,15,15,20,22,24

Mode: 15

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RANGE

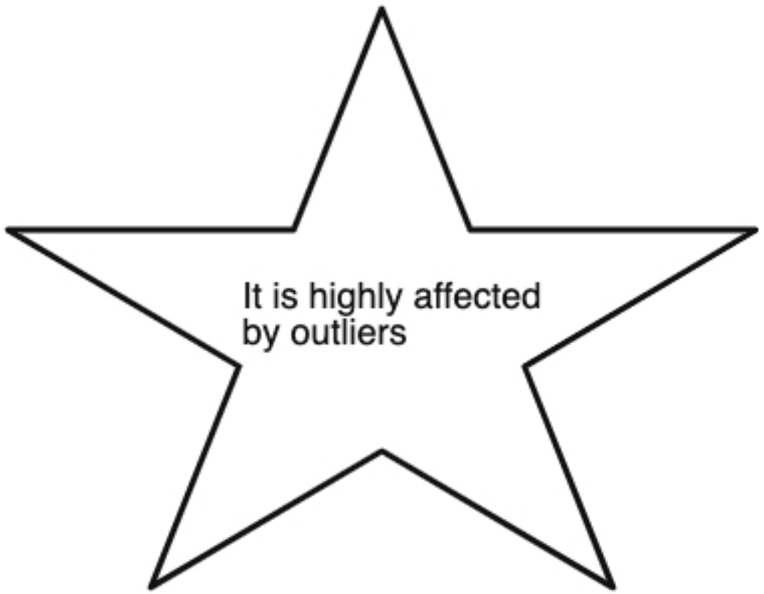
It is the difference between the lowest and the highest value.

Arrange the data in increasing order.

Subtract the highest and the lowest value.

The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41. Find the range

Range = 41-20 = 21 (Highest value-lowest value)



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SUMMARY

GCSE MATHS

MEAN, MEDIAN, MODE AND RANGE

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MEAN

- It is the average of the data
- Add all the Values and divide it by the total number of values

MEDIAN

- It is the middle Value
- Arrange the data in increasing order and find the middle value.
- If there are two values find the average.

MODE

- It is the most frequent Value
- Find the value that repeat itself maximum times.
- A data can have more than one mode

RANGE

It is the difference between lowest and the highest value.
Arrange the data in increasing order.
Subtract the highest and the lowest value.

WORKED EXAMPLE

The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41. Find mean, median, mode and range

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- It is the average of the data
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Arrange the data in increasing order.
Subtract the highest and the lowest value.

WORKED EXAMPLE

The marks score by John in a test are :-
20, 25,30, 35, 20, 20, 35,40,41. Find mean, median, mode and range

Mean= 20+25+30+35+20+20+35+40+41/9
= 29.55
Arrange data in increasing order=
20,20,20,25,30,35,35,40,41
Median= 30. (middle value)
Range = 41-20 = 21 (Highest value-lowest value)
Mode= 20 (Most Common)

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MEAN, MEDIAN, MODE AND RANGE FROM THE FREQENCY TABLE

This is the data of the number of pens a student has in a class.

Number of Pens	Frequency
1	10
2	12
3	15
4	10
5	7
6	20
7	10

Mean= Find the sum of number Xfrequency/ total of frequency

Mode= the value with highest frequency

Median= Find n+1/2.Do cumulative frequency

No of Pen (x_1)	Frequency (f_1)	$x_1 f_1$	C.F
1	10		
2	12		
3	15		
4	10		
5	7		
6	20		
7	10		

1 1 1 1 1 1 1 1 1 1
2 2 2 2 2 2

$$\text{Mean} = \frac{\Sigma x_1 f_1}{\Sigma f_1}$$

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3	15
4	10
5	7
6	20
7	10

Mean= Find the sum of number Xfrequency/ total of frequency

Mode= the value with highest frequency

Median= Find n+1/2.Do cumulative frequency

No of Pen (x_i)	Frequency (f_i)	$x_i f_i$	C.F
1	10	10	10
2	12	24	22
3	15	45	37
4	10	40	47
5	7	35	54
6	20	120	74
7	10	70	84
	84	344	

$\text{Mean} = \frac{344}{84} = 4.09$ pens

$\text{Median} = \frac{84+1}{2} = 42.50$

$= 4$ pen

Mode = 6 pens

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MEAN, MEDIAN, MODE AND RANGE FROM THE GROUPED DATA

The weight of 80 people are measured below

Weight Range	Frequency
$0 \leq x < 10$	5
$10 \leq x < 20$	10
$20 \leq x < 30$	15
$30 \leq x < 40$	20
$40 \leq x < 50$	30

For mean: Work out the midpoint of the range and find the product of midpoint and frequency for each class and find the sum.

Divide the sum by total frequency to find the mean.

Mode is the class with the highest frequency

For median find n+1/2 and find the interval which contains that value

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MEAN, MEDIAN, MODE AND RANGE FROM THE GROUPED DATA

The weight of 80 people are measured below

Weight Range (kg)	Frequency	Midpoint	Midpoint X frequency	C.F
$0 \leq x < 10$	5	10+0/2. =. 5	25	5
$10 \leq x < 20$	10	10+20/2. = 15	150	15
$20 \leq x < 30$	15	25	375	30
$30 \leq x < 40$	20	35	700	50
$40 \leq x < 50$	30	45	1350	80
	80		2600	

Mean = $\frac{2600}{80}$

= 32.5 kg

Mode = $40 \leq x < 50$

Median = $\frac{80+1}{2} = 40.5$

= $30 \leq x < 40$

81

2

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DATA COMPARISONS

The score of two students are given below:-

Student A: 25, 25,30,35,40

Student B: 30,30,37,38,40

Who performed better ?

	Mean	Median	Mode	Range
A				
B				

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DATA COMPARISONS

The score of two students are given below:-

Student A: 25, 25,30,35,40

Student B: 30,30,37,38,40

Who performed better ?

	Mean	Median	Mode	Range
A	31	30	25	15
B	35	37	30	10

So if we compare the mean,median and mode than B scores are the highest.

Also, the range of B is less which means B results are less spread.

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WORD PROBLEMS

BitPaper
Share Knowledge

Q1 These are the set of 5 numbers

Median is 7
Range is 12
Mode is 3
Mean is 8.

Work out the set of numbers

Q2 The mean of 6 number is 10
The mean of first two numbers is 8.
Find the mean of next four numbers.

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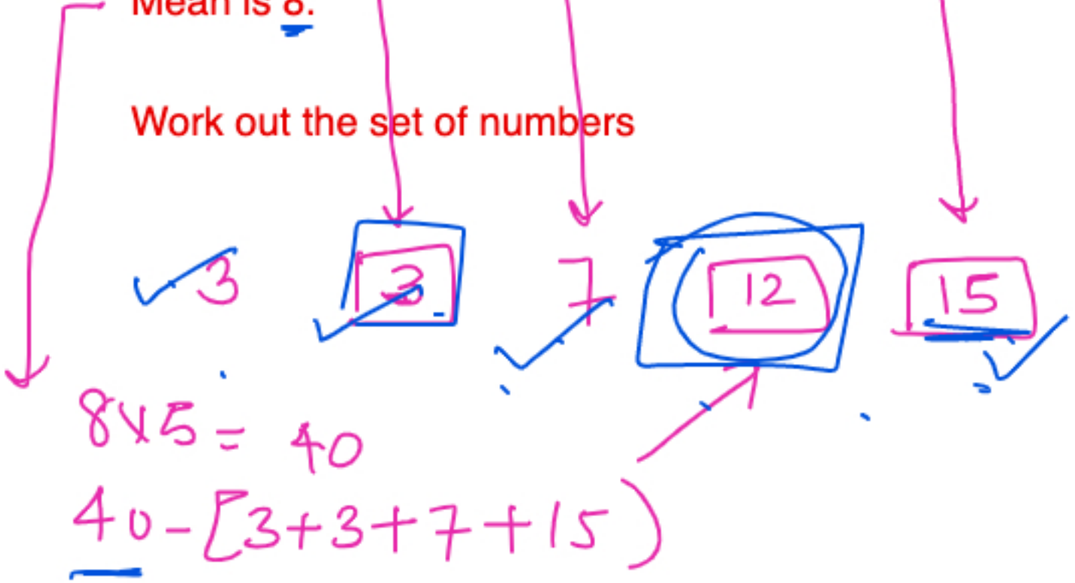

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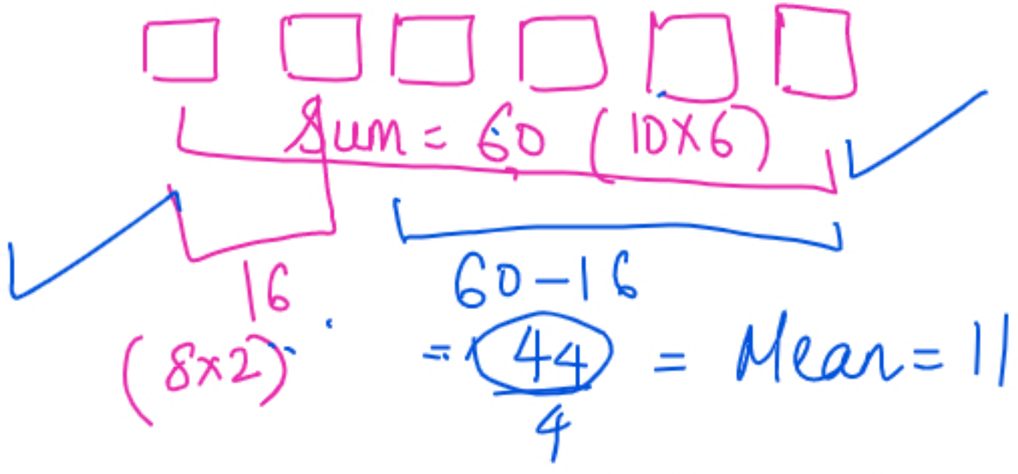

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NEXT STEP

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