

# Mean, Median, Mode, Range

## Types of Average

Mean  
Median  
Mode

## Measures of Spread

Range  
Inter Quartile Range  
(IQR)  
Standard Deviation  
(A-level)

## Data Sample

5, 9, 11, 6, 6, 8, 4

$$\text{Mean} = \frac{5+9+11+6+6+8+4}{7} = \frac{49}{7} = 7$$

Mean: Add up data and divide by number of data items

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Median      4, 5, 6, (6), 8, 9, 11

Median = 6

Median: Arrange data in order and choose middle item. If even number of data items then choose half way between middle two.

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Mode 5, 9, 11, 6, 6, 8, 4

Mode: 6

The data item that occurs most often

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$$\text{Range} = 11 - 4 = 7$$

The highest data item - the lowest data item

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Example 2 7, 3, 6, 4, 7, 4, 8, 7, 9, 2

$$\begin{aligned}\text{Mean} &= \frac{7+3+6+4+7+4+8+7+9+2}{10} = \frac{57}{10} \\ &= 5.7\end{aligned}$$

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2, 3, 4, 4, 6, 7, 7, 7, 8, 9

median is item  $\frac{n+1}{2} = \frac{10+1}{2} = \frac{11}{2} = 5.5^{\text{th}}$  item

$$\text{Median} = \frac{6+7}{2} = 6.5$$

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$$\text{Mode} = 7$$

$$\text{Range} = 9 - 2 = 7$$

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MEAN, MEDIAN, MODE AND RANGEEXERCISE

Find the mean, median, mode and range of the following data samples. You may use a calculator for questions 4 and 5.

1) 8, 4, 5, 8, 10, 7

2) 7, 9, 3, 1, 2, 3, 3

3) 5, 8, 6, 1, 3, 6, 5, 6

4) 21, 32, 18, 32, 44, 37, 25, 28, 33

5) 51, 40, 63, 72, 79, 63, 40, 75, 63, 56

1) 8, 4, 5, 8, 10, 7

$$\text{Mean} = \frac{8+4+5+8+10+7}{6} = \frac{42}{6} = 7$$

Median 4, 5, 7, 8, 8, 10  
 ↑

$$\text{Median} = 7.5$$

6 items  
 $6+1 = 7$   
 $\frac{7}{2} = 3\frac{1}{2}$   
 between 3rd  
 and 4th

Mode = 8 (occurs most often)

$$\begin{aligned} \text{Range} &= 10 - 4 \quad (\text{highest} - \text{lowest}) \\ &= 6 \end{aligned}$$


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MEAN, MEDIAN, MODE AND RANGE

## EXERCISE

2) 7, 9, 3, 1, 2, 3, 3

$$\text{Mean} = \frac{7+9+3+1+2+3+3}{7} = \frac{28}{7} = 4$$

Median 1, 2, 3, (3), 3, 7, 9

$$\text{Median} = 3$$

7 items

$$7+1=8$$

$$\frac{8}{2} = 4$$

4th item

Mode = 3 (occurs most often)

$$\begin{aligned} \text{Range} &= 9 - 1 && (\text{highest} - \text{lowest}) \\ &= 8 \end{aligned}$$


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MEAN, MEDIAN, MODE AND RANGEEXERCISE

3) 5, 8, 6, 1, 3, 6, 5, 6

$$\text{Mean} = \frac{5+8+6+1+3+6+5+6}{8} = \frac{40}{8} = 5$$

Median 1, 3, 5, 5, 6, 6, 6, 8  
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$$\text{Median} = 5.5$$

8 items

$$8 + 1 = 9$$

$$\frac{9}{2} = 4\frac{1}{2}$$

between 4<sup>th</sup>  
and 5<sup>th</sup>

Mode = 6 (occurs most often)

$$\begin{aligned} \text{Range} &= 8 - 1 \quad (\text{highest} - \text{lowest}) \\ &= 7 \end{aligned}$$


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MEAN, MEDIAN, MODE AND RANGEEXERCISE

4) 21, 32, 18, 32, 44, 37, 25, 28, 33

$$\text{Mean} = \frac{21 + 32 + 18 + 32 + 44 + 37 + 25 + 28 + 33}{9} = \frac{270}{9}$$

$$\text{Mean} = 30$$

Median 18, 21, 25, 28, (32), 32, 33, 37, 44

$$\text{Median} = 32$$

$$\begin{aligned} &9 \text{ items} \\ &9 + 1 = 10 \\ &\frac{10}{2} = 5 \\ &5^{\text{th}} \text{ item} \end{aligned}$$

Mode = 32 (occurs most often)

$$\begin{aligned} \text{Range} &= 44 - 18 \quad (\text{highest} - \text{lowest}) \\ &= 26 \end{aligned}$$


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6

MEAN, MEDIAN, MODE AND RANGE

EXERCISE

5) 51, 40, 63, 72, 79, 63, 40, 75, 63, 56

$$\text{Mean} = \frac{51+40+63+72+79+63+40+75+63+56}{10} = \frac{602}{10}$$

$$\text{Mean} = 60.2$$

Median 40, 40, 51, 56, 63, 63, 63, 72, 75, 79

↑

$$\text{Median} = 63$$

(half way between 63 and 63 is still 63)

10 items  
 $10+1=11$   
 $\frac{11}{2} = 5\frac{1}{2}$   
between 5<sup>th</sup>  
and 6<sup>th</sup> items

Mode = 63 (occurs most often)

$$\begin{aligned} \text{Range} &= 79 - 40 \quad (\text{highest} - \text{lowest}) \\ &= 39 \end{aligned}$$

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