Mean

Mean is defined as average of a given set of data. Let us consider the sequence of numbers **2, 4, 4, 4, 5, 5, 7, 9**, the mean (average) of this given sequence is 5.

$$\frac{2+4+4+4+5+5+7+9}{20} = 5$$

Formula for finding Mean:

$$\bar{x} = \frac{x_1 + x_2 + \dots x_n}{n}$$

Where, $x1, x2, \dots x_n$ denotes the terms of the given sequence and **n** is the count of numbers present in the given sequence.

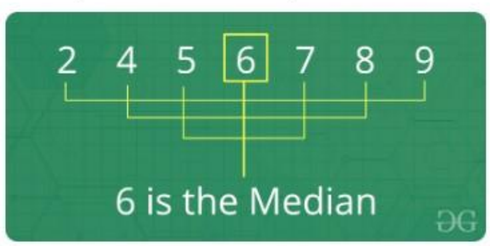
Facts about Mean :

1. The mean (or average) is the most popular and well known measure of central tendency.
2. It can be used with both discrete and continuous data, although its use is most often with continuous data.
3. There are other types of means. Geometric mean, Harmonic mean and Arithmetic mean.
4. Mean is the only measure of central tendency where the sum of the deviations of each value from the mean is always zero.

Median

Median is the middle value of a set of data. To determine the median value in a sequence of numbers, the numbers must first be arranged in an ascending order.

- If the count of numbers in the sequence is ODD, the median value is the number that is in the middle, with the same amount of numbers below and above.
- If the count of numbers in the sequence is EVEN, the median is the average of the two middle values.



Formula for finding Median :

- If the count of numbers is odd: After sorting the sequence,

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Median = {(N+1)/2}th value.
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- If the count of numbers is even: After sorting the sequence,

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Median  =  Average of (N/2)th and {(N/2) + 1}th value.
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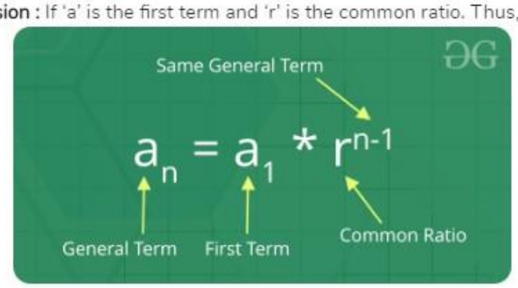
Facts about Median :

1. Median is an important measure (compared to mean) for distorted data, because median is not so easily distorted. For example, median of {1, 2, 2, 5, 100) is 2 and mean is 22.
2. If the user adds a constant to every value, the mean and median increases by the same constant.
3. If the user multiplies every value by a constant, the mean and the median will also be multiplied by that constant.

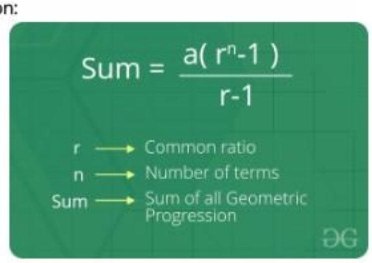
Facts about Geometric Progression :

1. **Initial term:** In a geometric progression, the first number is called the initial term.
2. **Common ratio:** The ratio between a term in the sequence and the term before it is called the "common ratio."
3. The behaviour of a geometric sequence depends on the value of the common ratio. If the common ratio is:
   - Positive, the terms will all be the same sign as the initial term.
   - Negative, the terms will alternate between positive and negative.
   - Greater than 1, there will be exponential growth towards positive or negative infinity (depending on the sign of the initial term).
   - 1, the progression is a constant sequence.
   - Between -1 and 1 but not zero, there will be exponential decay towards zero.
   - -1, the progression is an alternating sequence.
   - Less than -1, for the absolute values there is exponential growth towards (unsigned) infinity, due to the alternating sign.

Formula of n^{th} term of a Geometric Progression : If 'a' is the first term and 'r' is the common ratio. Thus, the explicit formula is:



Formula of sum of n^{th} term of Geometric Progression:



General Formulas to solve problems related to Geometric Progressions:

If 'a' is the first term and 'r' is the common ratio:

- **nth term of a GP** = $a*r^{n-1}$.
- **Geometric Mean** = n^{th} root of product of n terms in the GP.
- **Sum of 'n' terms** of a GP $(r < 1) = [a (1 – r^n)] / [1 – r]$.
- **Sum of 'n' terms** of a GP $(r > 1) = [a (r^n – 1)] / [r – 1]$.
- **Sum of infinite terms** of a GP $(r < 1) = (a) / (1 – r)$.