IMPORTANT FORMULA AND EQUATIONS

- Average:

Average = Sum of observations/ Number of observations

- Average Speed:

Suppose a man covers a certain distance at *x* kmph and an equal distance at *y* kmph.
Then, the average speed druing the whole journey **[2xy/(x+y)]**

- Average speed: if both the time taken are equal i.e **t1 = t2 = t ,then, t1 + t2 / 2**
- The average of odd numbers from **1 to n is = [Last odd no. + 1] / 2.**
- The average of even numbers from **1 to n is = [Last even no. + 2] / 2.**

Name	Equation or description
Arithmetic mean	$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i = \frac{1}{n}(x_1 + \cdots + x_n)$
Median	The middle value that separates the higher half from the lower half of the data set
Geometric median	A rotation invariant extension of the median for points in Rn
Mode	The most frequent value in the data set
Geometric mean	$\left(\prod_{i=1}^{n} x_i\right)^{\frac{1}{n}} = \sqrt[n]{x_1 \cdot x_2 \cdots x_n}$
Harmonic mean	$\frac{n}{\frac{1}{x_1} + \frac{1}{x_2} + \cdots + \frac{1}{x_n}}$
Quadratic mean (or RMS)	$\sqrt{\frac{1}{n}\sum_{i=1}^{n} x_i^2} = \sqrt{\frac{x_1^2 + x_2^2 + \cdots + x_n^2}{n}}$
Generalized mean	$\sqrt[p]{\frac{1}{n} \cdot \sum_{i=1}^{n} x_i^p}$

Weighted mean	$\frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i} = \frac{w_1 x_1 + w_2 x_2 + \cdots + w_n x_n}{w_1 + w_2 + \cdots + w_n}$
Truncated mean	The arithmetic mean of data values after a certain number or proportion of the highest and lowest data values have been discarded
Interquartile mean	A special case of the truncated mean, using the interquartile range
Midrange	$\frac{\max x + \min x}{2}$
Winsorized mean	Similar to the truncated mean, but, rather than deleting the extreme values, they are set equal to the largest and smallest values that remain
Annualization	$\left[\prod (1 + R_i)^{t_i}\right]^{1/\sum t_i} - 1$

- The Average of any number of quantities is sum of their quantities by the number of quantities (n). ⇒ Average $= \frac{Sum\ of\ quantities}{n}$
- If there are two types of items say A and B , A has m number of sub items and B has n number of sum items then the average of A and B is (Am+Bn)/(m+n)
- If a vehicle travels from one place to another at a speed of a kmph but returns at the speed of b kmph then its average speed during the whole journey is $\frac{2ab}{a+b}$ kmph.
- Out of three numbers, first number is x times of the second number and y times of the third number. If the average of all the three numbers is z then the first number is $\frac{3xyz}{xy+x+y}$
- Let the average age of men and women in a town be x years and the average age of women be y years and the average age of men be z years. Then the number of men in that town is $N\frac{x-y}{z-y}$ if N indicates the total number of men and women of the town.
- The average age of N persons is x years. If one new person joins them. Then the average age is increased by y years. Then the age of new comer is x + (1 + N) y years.
- The average age of N persons is x years. If M persons joins them, the average age is increased by y years then the average age of newcomers is $x+\left(1+\frac{N}{M}\right)$ y years
- The average age of N persons is x years. If M persons joins them, the average age is decreased by y years then the average age of new comers is $x-\left(1+\frac{N}{M}\right)$ y years

- The average age of N persons is x years. If M persons left, then the average age is increased by y years, then the average age ofoutgoing persons is $x+\left(1-\frac{N}{M}\right)$ y years.
- The average age of N persons is x years. If M persons left, then the average age is decreased by y years. Then the average age of outgoing persons is $x-\left(1-\frac{N}{M}\right)$ y years
- In a group of N persons whose average age is increased by y years when a person of x years is replaced by a new man. Then the age of new comer is x + Ny years.
- The average temperature of Sunday, Monday, Tuesday and Wednesday was Xo C. The average temperature for Monday, Tuesday, Wednesday and Thursday was Yo C. If the temperature on Thursday is ao C then the temperature on Sunday (bo C) can be given as bo C = No of days (X -Y) +a Here No of days = 4.