

## 1. General Rules we must know to solve Averages Problems

### Formula:

- Average: = (Sum of observations / Number of observations).

### Find the Average Speed

- If a person travels a distance at a speed of x km/hr and the same distance at a speed of y km/hr then the average speed during the whole journey is given by-
- If a person covers A km at x km/hr and B km at y km/hr and C km at z km/hr, then the average speed in covering the whole distance is-  $\{ (A+B+C) / ( [A/x] + [B/y] + [C/z] ) \}$

**When a person leaves the group and another person joins the group in place of that person then-**

- If the average age is increased,

Age of new person = Age of separated person + (Increase in average × total number of persons)

- If the average age is decreased,

Age of new person = Age of separated person – (Decrease in average × total number of persons)

**When a person joins the group-**

- In case of increase in average

Age of new member = Previous average + (Increase in average × Number of members including new member)

- In case of decrease in average : Age of new member = Previous average – (Decrease in average × Number of members including new member)

## 2. General Rules we must know to solve Percentages

### Basic Rules:

- If the price of the commodity increases by R%, then the reduction in the consumption as not to increase the expenditure is  $[R/(100+R) \times 100]\%$ .
- If the price of the commodity decreases by R%, then the increase in the consumption as not to increase the expenditure is  $[R/(100-R) \times 100]\%$ .
- If A is R% more than B, then B is less than A by  $[R/(100+R) \times 100]\%$ .
- If A is R% less than B, then B is less than A by  $[R/(100-R) \times 100]\%$ .

**Rules for Population Problems:**

Let the population of a town be P now and suppose it increases at the rate of R% per annum then:

- Population after n years =  $P(1+R/100)^n$
- Population n years ago =  $P/(1+R/100)^n$

**Rules for Depreciation Problems:**

Let the present value of a machine be P. Suppose it depreciates at the rate of R% per annum then

- Value of the machine after n years =  $P(1-R/100)^n$
- Value of the machine after n years =  $P/(1-R/100)^n$

**Things to be remembered:**

1.  $1 = 100\%$
2.  $1/2 = 50\%$
3.  $1/3 = 33\%$
4.  $1/4 = 25\%$
5.  $1/5 = 20\%$
6.  $1/6 = 16\%$
7.  $1/7 = 14\%$
8.  $1/8 = 12\%$
9.  $1/9 = 11\%$
10.  $1/10 = 10\%$
11.  $1/11 = 9\%$
12.  $1/12 = 8\%$
13.  $1/13 = 7\%$