(Talent & Olympiad Notes)

Arithmetic

• Percent:

'Percent' means 'for every hundred'.

Symbol for percentage is %.

• Conversions:

a) Percentage to decimals:

To convert a percentage to a decimal, divide the number by 100.

e.g.,
$$68\% = \frac{68}{100} = 0.68$$

b) Decimal to percentage:

To convert a decimal to a percentage, multiply the number by 100%.

e.g., $0.59 = 0.59 \times 100\% = 59\%$

c) Percentage to fraction:

To convert a percentage to a fraction, write the number with denominator 100 and reduce the fraction to its lowest terms.

e.g.,
$$45\% = \frac{45}{100} = \frac{9}{20}$$

d) Fraction to percentage:

To convert a fraction to a percentage, multiply one fraction with 100%

e.g.,
$$\frac{9}{20} = \frac{9}{20} \times 100\% = 45\%$$

e) Finding the percent of a quantity:

To find the percent of a quantity, multiply them and simplify.

e.g., 30% Rs 100

$$\frac{30}{100} \times \text{Rs}100 = \text{Rs}30$$

• Average:

 $Average = \frac{The \ sum \ of \ quantities}{The \ number \ of \ quantities}$

• Ratio:

(a) The comparison of two quantities of the same kind by division gives their ratio.

(b) The two quantities compared are written with a : (colon) between them.

e.g., a; b read as 'a is to b'.

(c) Ratio of two numbers can be thought of as a fraction and all the rules for operations with fractions can be used.

(d) Double, triple, four times, etc., can be expressed in ratio as 2:1, 3:1, 4:1, etc.

(e) A ratio can be expressed as a fraction.

e.g., 2: 5 is the same as $\frac{2}{5}$.

(f) In a ratio a: b, the first term 'a' is called the antecedent and the second term 'b' is called the consequent. The order of terms of a ratio is important i.e., 1:4 is not the same ratio as 4:1.

(g) To find the ratio of two like quantities, they should be changed into the same unit of measurement.

(h) While writing a ratio, co-prime numbers are generally used, that is, the ratio is often expressed in the lowest terms by cancelling the common factors from both the numbers.

(i) A ratio does not have any unit of measurement.

• Speed, Distance and Time:

Speed = $\frac{\text{Distance}}{\text{Time}}$ Average = $\frac{\text{Total distance covered}}{\text{Total time taken}}$

 $Distance = Speed \times Time$

Time = $\frac{\text{Distance}}{\text{Speed}}$

• Simple Interest:

 $|=\frac{PTR}{100}$, where |= Interest, P = Principal, T = Time, R = Rate per annum

Amount (A) = P + $| \Rightarrow | = A - P$ and also P = A - |

• Profit and Loss:

(i) The price of an article is called its cost price denoted as C.R

(ii) The price at which an article is sold is called its selling price denoted as S.R

(iii) If the selling price is greater than the cost price, there is a gain/profit, which is equal to the difference of selling price and cost price.

 \therefore If S.P. > C.R, gain = S.R – C.R

a) S.R = Gain + C.R

b) C.R = S.R - Gain

(iv) If S.R < C.R there is a loss, which is equal to the difference of cost price and sell in price.

 \therefore If S.R < C.R, loss = C.R - S.R

a) C.R = Loss + S.P

b) S.R = C.R - Loss

• Percentage profit and percentage loss:

Profit or loss is incurred on the cost price.

So, percentage profit = $\frac{\text{Profit}}{\text{C.P.}} \times 100\%$ and percentage loss = $\frac{\text{loss}}{\text{C.P.}} \times 100\%$.