

## ■ Aptitude Formula Handbook

### 1. Percentages

**Formula:** Formula:  $(\text{Value} / \text{Total Value}) \times 100$

**Example:** Example: What is 20% of 150? Solution:  $(20/100) \times 150 = 30$

### 2. Ratios & Proportions

**Formula:** Formula:  $a:b = a/b$ , Proportion  $\rightarrow a/b = c/d$

**Example:** Example: If  $2:3 = x:12$ , find  $x$ . Solution:  $x = (2 \times 12)/3 = 8$

### 3. Profit & Loss

**Formula:** Profit = SP – CP, Loss = CP – SP Profit% =  $(\text{Profit}/\text{CP}) \times 100$ , Loss% =  $(\text{Loss}/\text{CP}) \times 100$

**Example:** Example: CP=100, SP=120  $\rightarrow$  Profit=20%, Loss=0

### 4. Simple Interest

**Formula:** SI =  $(P \times R \times T)/100$

**Example:** Example: P=1000, R=10%, T=2 yrs  $\rightarrow$  SI=200

### 5. Compound Interest

**Formula:** CI =  $P(1 + R/100)^T - P$

**Example:** Example: P=1000, R=10%, T=2 yrs  $\rightarrow$  CI=210

### 6. Time & Work

**Formula:** Work = Rate  $\times$  Time If A does work in  $x$  days, 1 day's work =  $1/x$

**Example:** Example: A=10 days, B=20 days  $\rightarrow$  Together=  $(1/10 + 1/20) = 3/20 \rightarrow 20/3 = 6.67$  days

### 7. Pipes & Cisterns

**Formula:** Similar to Time & Work problems.

**Example:** Example: Pipe A fills in 3 hrs, B in 6 hrs. Together=  $(1/3 + 1/6) = 1/2 \rightarrow 2$  hrs

### 8. Time, Speed & Distance

**Formula:** Speed = Distance/Time, Distance = Speed $\times$ Time

**Example:** Example: Distance=100 km, Speed=50 km/h  $\rightarrow$  Time=2 hrs

### 9. Boats & Streams

**Formula:** Downstream = Speed of boat + Speed of stream Upstream = Boat – Stream

**Example:** Example: Boat=10, Stream=2  $\rightarrow$  Down=12, Up=8

### 10. Trains Problems

**Formula:** Relative Speed = Sum/Diff of speeds

**Example:** Example: Train length=100m, Speed=20m/s  $\rightarrow$  Time to pass pole=100/20=5s

### 11. Averages

**Formula:** Average = Sum of items / Number of items

**Example:** Example: [2,4,6,8]  $\rightarrow$  Avg=20/4=5

## 12. Mixtures & Alligations

**Formula:** Rule of alligation:  $(C1 - \text{Mean}) : (\text{Mean} - C2)$

**Example:** Example: Mix 40% milk with 60% water to get 50%: Ratio=1:1

## 13. Partnerships

**Formula:** Profit share =  $(\text{Capital} \times \text{Time}) / \text{Total}$

**Example:** Example: A invests 100 for 12m, B=200 for 6m  $\rightarrow$  Ratio=1200:1200=1:1

## 14. Permutations & Combinations

**Formula:**  $nPr = n! / (n-r)!$ ,  $nCr = n! / [r!(n-r)!]$

**Example:** Example:  $5C2 = 10$ ,  $5P2 = 20$

## 15. Probability

**Formula:**  $P(E) = \text{Favourable} / \text{Total outcomes}$

**Example:** Example: Coin toss  $\rightarrow P(\text{Head}) = 1/2$

## 16. Mensuration (2D, 3D)

**Formula:** Square=  $a^2$ , Rectangle=  $l \times b$ , Circle=  $\pi r^2$ , Sphere=  $4/3 \pi r^3$

**Example:** Example: Circle radius=7  $\rightarrow$  Area=154

## 17. Number System

**Formula:**  $\text{HCF} \times \text{LCM} = \text{Product of numbers}$

**Example:** Example:  $\text{HCF}(12, 18) = 6$ ,  $\text{LCM} = 36$

## 18. Progressions

**Formula:** AP:  $a, a+d, \dots$   $a_n = a + (n-1)d$  GP:  $a, ar, ar^2, \dots$

**Example:** Example: AP(2, 4, 6, ...),  $n=5 \rightarrow a_5 = 2 + (5-1)2 = 10$

## 19. Logarithms

**Formula:**  $\log(ab) = \log a + \log b$ ,  $\log(a/b) = \log a - \log b$

**Example:** Example:  $\log(100) = 2$  (base 10)

## 20. Surds & Indices

**Formula:**  $a^m \times a^n = a^{(m+n)}$ ,  $(a^m)^n = a^{(mn)}$

**Example:** Example:  $2^3 \times 2^2 = 2^{\blacksquare} = 32$