

■ 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= πr^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: $2^3 \times 2^2 = 2^{\blacksquare} = 32$