AVERAGE - COMPLETE MASTER SHEET

1■■ Basic Direct Questions

Example: Find the average of 5, 7, 8, 10, 12.
→ Add and divide. Average = 42/5 = 8.4.
Trick: Simple formula based. Used in basic exams.

2■■ Change of Value or Quantity

Example: Avg of 10 nos = 40. One new number 60 added.
→ Old sum = 10×40=400, New sum=460, Avg=460/11=41.82.
Trick: Use total = avg×n always.

3■■ Equal Distribution (Shift)

Example: Avg=40, each increased by 5 → New avg=45.
Trick: If each term changes by same amount, avg changes equally.

4■■ Combined Average

Example: Avg of 10 men=40, 20 women=30.
→ Combined avg=(10×40+20×30)/(10+20)=33.33.
Trick: Weighted average = total sum / total quantity.

5■■ Replacement Type

Example: Avg of 10 nos=20. Replace 30 by 40.
→ Change=(40–30)/10=+1 → New avg=21.
Trick: Quick mental trick (New–Old)/n.

6■■ Missing Term

Example: Avg of 5 nos=50, sum of 4=180.
→ Missing=250–180=70.
Trick: Use total = n×avg.

7■■ Equal & Opposite Changes

Example: Avg=25, one +2, other –2 → No change.
Trick: Net total same → avg unchanged.

8■■ Average Speed

Example: Half at 60 km/h, half at 40 km/h.
→ Avg speed=2ab/(a+b)=48 km/h.
Trick: Use harmonic mean for equal distances.

9■■ Average Age

Example: Avg age of father & son=25, father older by 30.
→ (x+x+30)/2=25 ⇒ x=10 ⇒ Father=40.
Trick: Use algebra with average formula.

10■■ Word-Trick Type

Example: Avg 40, new avg 42 after 1 joins (10 persons).
→ Change=10×2=20 ⇒ New person 20 older.
Trick: Average change × number = total change.

11■■ Weighted Average (Percent)

Example: 40% score 60, 60% score 80.
→ (40×60+60×80)/100=72.
Trick: Weighted average = (w■x■ + w■x■)/Σw.

12■■ Mixture & Alligation

Example: Milk:Water::3:2, values ■60 & ■30, avg ■48.
→ (48–30):(60–48)=18:12=3:2.
Trick: Alligation formula.

13■■ Successive Addition/Removal

Example: Avg=25 (20 people), 45 yrs joins.
→ Change=(45–25)/21≈0.95 → New avg=25.95.
Trick: ∆avg=(New–Old avg)/(n+1).

14■■ Series Numbers

Example: Avg of first 20 natural nos.
→ (1+20)/2=10.5.
Trick: Avg=(first+last)/2 for continuous numbers.

Quick Revision Tricks

Situation	Shortcut
Same addition/subtraction	Avg changes by same value
One term replaced	New avg = Old avg + (Change ÷ n)
Equal distances	2ab/(a+b)
Group avg	Weighted mean
Continuous nos	(First + Last)/2
New member added	∆avg = (New–Old avg)/(n+1)