

## Quantitative Aptitude

### Concepts based on Ratio Proportion (Age & Number Based):

Concept	Key Point to Remember
1. Present Age Ratio	Let ages be: $a \times k$ and $b \times k$ (based on given ratio)
2. Age Difference	The difference in ages <b>always remains constant</b> over time
3. Future or Past Age Problems	Add/subtract same number of years to both ratios before comparing
4. Cross Multiplication	Use cross multiplication to solve equations involving ratio after 'x' years
5. Sum of Ages	Total Age = Sum of parts = $(a + b + c \dots) \times$ common multiple (k)
6. Age = Present $\pm$ Years	Age after n years = Present age + n Age n years ago = Present age - n
7. Watch for Tricky Language	Words like 'after', 'before', 'twice the age', 'thrice as old' change framing
8. Frame Equations Carefully	Use "age + years" or "age - years" while maintaining the ratio correctly
9. Use one variable (x or k)	Convert ratios to <b>multiples of a variable</b> for easy substitution
10. Read units of age carefully	Check if the age is given in <b>years, months or a combination</b> (rare cases)

### Ratio Proportion Concepts based on Coin:

S.No.	Concept	Explanation	Example
1	Basic Ratio of Number of Coins	Ratio given is based on <b>number of coins</b> , not value.	$\text{₹}1:\text{₹}2:\text{₹}5$ coins = 3:2:1 $\rightarrow$ Values = $3 \times 1 + 2 \times 2 + 1 \times 5 = \text{₹}12$
2	Ratio Based on Value	Ratio given is based on <b>value</b> , must convert to number of coins using: Value $\div$ Denomination	Value ratio 1:4:5 $\rightarrow \text{₹}1x, \text{₹}4x, \text{₹}5x \rightarrow$ No. of coins = x, 2x, x $\Rightarrow$ Ratio = 1:2:1
3	Total Number of Coins Given	Use total parts of ratio to find coins of each denomination: Coins = (Ratio $\div$ Total Ratio) $\times$ Total Coins	$\text{₹}1:\text{₹}2:\text{₹}5 = 2:3:5$ , Total = 100 $\rightarrow$ Total parts = 10 $\rightarrow \text{₹}1$ coins = 20, $\text{₹}2$ = 30, $\text{₹}5$ = 50
4	Total Value of Coins Given	Use weighted sum formula: Total Value = (Qty $\times$ Denomination) for each coin	Ratio = 3:2:1, Total value = $\text{₹}360 \rightarrow 3x + 4x + 5x = 12x = 360 \Rightarrow x = 30 \rightarrow$ Coins = 90, 60, 30
5	Difference-Based Questions	Use difference in value or count to form equations and solve for ratio parts.	Ratio of $\text{₹}1:\text{₹}2 = 3:4$ , Value difference = $\text{₹}10 \rightarrow 8x - 3x = 5x = 10 \Rightarrow x = 2 \Rightarrow \text{₹}1$ coins = 6, $\text{₹}2$ = 8
6	Mixture or Replacement Type	When coin counts are added/removed, resulting in a new ratio; use ratio-change equation.	$\text{₹}1:\text{₹}2 = 2:5$ ; add 10 $\text{₹}1$ coins $\rightarrow$ New ratio = 4:5 $\Rightarrow (2x + 10)/5x = 4/5 \Rightarrow$ solve for x

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