PROBLEM ON AGES

Dear students in the series of study notes this week our topic is Problems based on ages which is a sub topic of Ratio and proportion means we will use all logic and shortcuts what we studied in that chapter. So lets start...



If the current age of a person be X, then

- age after n years = X + n
- age n years ago = X n
- n times the age = nX

- If ages in the numerical are mentioned in ratio A : B, then A : B will be AX and BX Students frankly speaking there is no basic in this chapter so we will learn through questions so lets start

Q.1. The age of the father 3 years ago was 7 times the age of his son. At present, the father's age is five times that of his son. What are the present ages of the father and the son?

Solution:

Let the present age of son = x years Then, the present age of father = 5xyr3 years ago, 7(x - 3) = 5x - 3Or, 7x - 21 = 5x - 3Or, 2x = 18x = 9 years. Therefore, son's age = 9 years Father's age = 45 years Short tricks:-

Son's age = $3 \times \frac{7-1}{7-5} = 9$ years

And father's age = $9 \times 5 = 45$ years.

Q.2. At present, the age of the father is five times the age of his son. Three years hence, the father's age would be four times that of his son. Find the present ages of the father and the son.

Solution:

Let the present age of son = x years Then, the present age of father = 5x years 3 years hence, 4(x+3)=5x+3Or, 4x + 12=5x + 3 x = 9 years. Therefore, son's age = 9 years and father's age = 45 years Short tricks : Son's age = $\{3 \times (4-1)/5-4\} = 9$ years father's age = $9 \times 5 = 45$ years

Q.3. Three years earlier, the father was 7 times as old as his son. Three years hence, the father's age would be four times of his son. What are the present ages of the father and the son?

Solution:

Let the present age of son = x years and the present age of father = y years

3 years earlier, 7(x - 3) = y - 3 7x - y = 18.....(i) 3 yes hence, 4(x+3) = y + 3 4x + 12 = y + 3 4x - y = -9.....(ii) Solving (1) & (2) we get, x = 9 years & y = 45 years

Short tricks :

Son's age = $\{3 \times (4-1) + 3(7-1)\}/(7-4) = 9$ years

Q.4. The sum of the ages of a mother and her daughter is 50 years. Also 5 years ago, the

mother's age was 7 times the age of the daughter. What are the present ages of the mother and the daughter?

Solution:

Let the age of the daughter be x years. Then, the age of the mother is (50x - x)years 5 years ago, 7(x - 5) = 50 - x - 5Or, 8x = 50 - 5 + 35 = 80 x = 10Therefore, daughter's age = 10 years and mother's age = 40 years **Short tricks :** $50 + 5 \times \frac{7 - 1}{7 + 1} = 10$ years Thus, daughter's age = 10 years and mother's age = 40 years The sum of the ages of a son and father is

Q.5. The sum of the ages of a son and father is 56 years. After 4 years, the age of the father will be three times that of the son. What is the age of the son?

Solution:

Let the age of the son be x years. Then, the age of the father is (56 - x) years. After 4 years, 3(x+4) = 56 - x + 4Or, 4x = 56 + 4 - 12 = 48 x = 12 years Thus, son's age = 12 years. Short tricks : $\{56 - 4(3-1)\}/(3+1)$ = 12 years

	Now	5 years from now	13 years from now
Albert	х	x + 5	x + 13
Vince	Зx	3x + 5	3x + 13

Q.6. The present age of the father is 5 times the age of his son. Five years ago, the age of

the Father was ten times the age of his son at that time. How old is the father at present? (1) 45 years (2) 40 years (4) 49 years (3) 48 years (5) None of these Regular Method to solve Age Problem Solution: Step 1: Let us assume father's present age as F Let us assume the present age of the son to be as S Step 2: As mentioned in the question, the present age of the father is 5 times the age of son $F = 5 \times S$ (i) Step 3: Now frame an equation now (F-5) = 10(S-5) (ii) Step 4: F - 5 = 10S - 505S - 5 = 10S - 505S = 45S = 9 $F = 9 \times 5 = 45$ **SMART METHOD TO SOLVE AGE** PROBLEMS Step 1:

To solve this question using the smart method, we need to understand the question carefully.

As mentioned in the question that the father's age is 5 times the age of son, we can clearly make out that the father's age should be a multiple of 5.

By this, we can easily eliminate the options which are not the multiples of 5. Therefore, option 3 and option 4 are eliminated.

Step 2:

If the father's present age is 45 then the son's age would be 9, since the father is 5 times the son's age.

Now, five years ago father's age would be 40 and son's age would be 4.

Hence, the second statement states that 5 years ago father's age was 10 times the age of the son.

As, 40 = 10 x 4; option 1 satisfies both the condition.

Therefore the father's present age is 45.

Question: Father's age is 25 years more than the son's age. Four years hence,

Fathers age will become 1 less than thrice the son's age

What is father's present age?

(1) 31 (2) 38 (3) 34

(4) 36 (5) None of these

Regular Method to solve Age Problems **Solution:**

Step 1:

Let us assume father's present age to be as 'F.'

Let us assume son's present age to be as 'S.'

As mentioned in the question father's age is 25 years more than the son's age.

F = S + 25 (i)

Step 2:

After 4 years, Father's age = F + 4Son's age = S + 4Father's age is 1 less than the thrice of son's age F + 4 = 3 (S + 4) - 1 (ii) **Step 3:** By substituting equation (i) in equation (ii)

we get that, F + 4 = 3 (F - 25 + 4) - 1 F + 4 = 3F - 63 - 12F = 68





1.

2.

The ratio of A's age 3 years ago and B's age 5 years ago is 4:5. If A is 4 years younger than B then what is the present age of B? Solution: Approach 1: Let assume at present A's age is X and B's age is Y. Given, (X-3):(Y-5) = 4:5 and X = Y-4Solve both equations and then get X and Y. Now, we have to equations and two variables. Generally, this type of approach consumes more time and is not preferable. Approach 2: In this type of question, assume only one variable i.e. called base variable. Let A's present age is X, then B's present age is X+4. Students often commit silly mistakes, they tick the option which have X value but present age of B is asked in question. So, (A's 3 years ago):(B's 5 years ago) = 4:5 (X-3): (X+4-5) = 4:5(X-3): (X-1) = 4:55X-15 = 4X-4X=11 i.e. A's Present age and B's present age is X+4 = 11+4 = 15years. A is 3 years older than B while B is 2 years

A is 3 years older than B while B is 2 years older than C. The ratio of age of A 4 years hence and B 3years ago is 5:3. What was the age of C 6 years ago? Solution: There are three variables in this question and students are often confused about which variables should be assumed as base variable. You can see in question relation of B with both A and C is mentioned. So, you can assume B as base variable. If you assume another one as base variable, there is a chance that calculation may become a little harder. Let present age of B's is X, then A's age = X+3 and C's age = X-2(Age of A 4 years hence): (Age of B 4 years ago) = 5:3(X+3+4): (X-3) = 5:34. (X+7): (X-3) = 5:33X+21 = 5X-152X = 36X = 18present age of C is X-2 = 18-2 = 16 years age of C 6 years ago = 16-6 = 10 years Shortcut: (X+7): (X-3) = 5:3 difference of 5 and 3 is directly proportional to difference of (X+7) and (X-3)So,(5-3) ∝ (X+7)-(X-3) $2 \propto 10$ $1 \propto 5$ We can write $X+7 = 5 \times 5$, X = 185. Hence, age of C 6 years ago = 10 years The average age of Atul, Jatin and Sonu is 24 years. 2 year ago, average age of Atul and Sonu was 23 years. 2 years hence average age of Jatin and Sonu is 26 years. Find the present age of Sonu? Solution: Given, average age of Atul, Jatin and Sonu = 24 years \therefore total age of Atul, Jatin and Sonu = 24×3

3.

= 72 years(1) 2 years ago, average age of Atul and Sonu = 232 years ago, total age of Atul and Sonu = 46 \therefore present total age of Atul and Sonu = 50(2) 2 years hence, average age of Jatin and Sonu = 262 years hence, total age of Jatin and Sonu = 52 \therefore present total age of Jatin and Sonu = 48(3) From equation 1, 2 and 3 Present age of Sonu is 26 years. The average age of A and B is 25 years. If C were to replace A, the average would be 24 and if C were to replace B, the average would be 26. What are the ages of A, B and C respectively? Solution: Given, avg. of (A+B) = 25 $\therefore (A+B) = 50$ Avg. of (C+B) = 24 $\therefore (C+B) = 48$ Avg. of (A+C) = 26 $\therefore (A+C) = 52$ Now, A+B+C = (50+48+52)/2A + B + C = 75C = 25, A = 27, B = 23The ages of Sona and Mona are in the ratio of 15:17 respectively. After 6 years, the ratio of their ages will be 9:10. What will be the age of Mona after 6 years? Solution: Let present age of Sona is 15X, then Mona = 17XGiven, (15X+6) : (17X+6) = 9 : 10150X+60 = 153X+543X = 6X = 2 years Age of Mona after 6 years is $(17 \times 2+6)$

= 40 years. Now, we will discuss questions which are asked by some of our students. 1. The present ages of A,B and C in proportion 4:7:9, eight years ago, the sum of their ages was 56. find their respective ages (in years) Solution: Let ratio of present ages of A,B and C is 4x:7x:9x sum of their ages eight years ago = 56(4x-8)+(7x-8)+(9x-8) = 5620x = 80 $\mathbf{x} = 4$ A = 4x = 16 years B = 7x = 28 years C = 9x = 36 years he sum of the ages of Rinku and Gopal is 2. 40 years. 5 years hence ratio of their ages will be 3:7. Find the age of Rinku? Solution: Given 5 years hence ratio of ages of Rinku and Gopal is 3:7 let 5 years hence, age of Rinku = 3X and Gopal = 7XSo, present age of Rinku = 3X-5 and Gopal = 7x-5Sum of present ages of Rinku and Gopal = 40(3X-5)+(7X-5) = 4010X = 50X = 5present age of Rinku = 3X-5 = 10 years 3. The present age of Romila is one-fourth that of her father. After 6 years the father's age will be twice the age of Kapil. If Kapil celebrated fifth birthday 8 years ago. What is Romila's present age? Solution:

Let present age of Romila is X, then

Father's age = 4X

6 years hence, father's age = 4X+62 (Age of Kapil) = 4X+6Age of Kapil = 2X+3Present age of Kapil = 2X+3-6 = 2X-3Kapil celebrated his 5th bairthday 8 years ago So, Present age of Kapil is 5+8 = 13 years 2X-3 = 132X = 16X = 8 years. Shortcut approach: Kapil celebrated his 5th birthday 8 years ago. Present age of Kapil = 13After 6years, father's age will be twice of the Kapil. 2x(13+6) = 4X+6X = 8 years A man's age is 133(1/3)% of what it was 8 years ago, but 80% of what it will be after 8 years. What is his present age? Solution: Let the present age be X years. Then 133(1/3)% of (X-8) = X and 80%(X+8) = XSo, 133(1/3)% of (X-8) = 80%(X+8) 4(X-8)/3 = 4(X+8)/55(X-8) = 3(X+8)2X = 64X = 32Shortcut: You don't need to solve both equation. Solve any equation you will get the answer. 133(1/3)% of (X-8) = X 4(X-8)/3 = X

$$4X-32 = 3X$$

X = 32 years

4.

SOLVED EXERCISE

Q.1. Difference between ages of Raman and Preet is 16 years. If Raman's age ten years hence will be two times the age of Preet, find Raman's age.

R - P = 16(R + 10) = 2P Solve, R = 42

Q.2. When a couple was married, their average age was 22 years. When their first child was born, the average age of all the three became16 years. When their second child was born, the average of all 4 became 15 years. Find the average age of couple at the time when their second child was born. At the time of marriage total age of couple=44 when 1st child is born total age of

three= $16 \times 3 = 48$

Difference=48-44=4 years (Child is of 0 years hence this is the sum of age increase of couple)

When second child is born sum of $age=4 \times 15=60$ years

=> increase of 12 years after first child, means age of husband, wife and first child increased by 4 years each. SO increase in husband and wife

total age = 8 years total increase =4+8=12 total age=44+12=56; average=56/2=28 years

Q.3. The average age of a group of 20 men is 22 years. If two men whose age are 24 and 31 years respectively join the group, the average age of new group increase or decrease by

When 2 new people join if the sum of their age is 44 then the average will not change, but the sum of age of new people is 55 i.e increase of 11

hence avg increases by 11/22=0.5 years.

Q.4. The ratio of present age of Tiya and Piya is 3:5 and the ratio of ages of Tiya 5 years ago and Piya 5 years hence is 1:3. Find the present age of Piya. T/P=3/5 ——- (i) T-5/P+5=1/3 ——-- (ii) Solve and get T=15 years

P= 25 years

Q.5. 10 years ago daughter's age was two-fifth of her mother's age that time. While 10 years hence her age will be three-fifth of her mother's age then. Find the difference in the ages of the two.

(x-10) = 2/5 (y-10)(x+10) = 3/5 (y+10)

Solve, x = 26 and y = 50

Q.6. A person's present age is two-ninth of the age of his mother. After 10 years, he will be four-eleventh of the age of his mother. How old is the mother after 15 years? Present ratio P:M ==>2:9 After 10years P:M=4:11 Then (2x+10)/(9x+10) = 4/1122x+110=36x+40X=5.

Then Mother's present age= $9 \times 5=45$ years. After 15 years Mother's age is=60 years.

Q.7. Ratio of the ages of A and B is 5 : x. A is 18 years younger to C. After nine years C will be 47 years old. If the difference between the ages of A and B is same as the age of C, what is the value of x? A:B=5:x -1 A = C - 18 -2 C + 9 = 47 =>C=47-9=38 years. A - B = C -3 From 2 A=38-18=20 years. From 1 20/B=5/x==> B=4x From 3 4x-20=38

X=14.5.

Q.8. Ratio of present age of A and B is 7 : 9 and ratio of ages of A 5 years back and age of B 5 years later is 3:5. Find the present age of B. A/B=7/9

(A-5)/(B+5)=3/5

solve both and get A=35 and B=45

Q.9. The present age of a son is 40% of his father age. And the age of his mother is 220% of his age. The average age of three members is 38. Find the present age of mother. Son= 40% of father.

F:S=5:2

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Mother=220% of son=11/5
M:S=11:5
make F:M:S =25:22:10
avg=(25+22+10)/3=19
19=38
1=2
=>22=44
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Q.10. Rama got married 8 years ago. Her present age is 1 (1/3) times of her age at the time of marriage. She has a son who is one eighth of her present age. Then find the age of her son.

1 (1/3)=4/3

Ratio of present age of Rama and her age at time of marriage=4:3 —— difference =1

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1=8 years
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4=32

age of son=32/8=4 years

Q.11. The fathers age is four times as much as the sum of the age of his three children but 6 years hence his age will be thrice as the sum of their age. The present age of father is?

Let sum of children age=x ; hence father =4x (4x+6)/x+6 = 3/1x=12; father=48 Q.12. In a class of 20 students the average of all the students is 18 years. If the age of their teacher is added then the average becomes 19 years. Find the age of teacher after 5 year. Let age of teacher=x

(total age)/ total people=19 360+x/21=19x=39hence age after 5 years=44

- Q.13. The average age of a couple at the time of their marriage was 22. Two years after the marriage their child was born. Now he is 4 years old. Find the average age of their present age.
 Sum of couples age at time of marriage=2×22=44 when son was born, total age=44+2+2=48 After 4 years total age=48+4+4+4=60 avg=60/3=20
- **Q.15.** Sheetal's age at the time of her marriage was 4/5th of her present age. If she married 6 years ago and now she has a son who is 1/10th of her present age, then find the age of her son 5 years hence.

 $4/5 \times 6 = 24/30$ 24 => at the time of marriage 30 years => now Son = 1/10 of present age = $1/10 \times 30 = 3$ years 5 years hence = 3+5 = 8 years

Q.16. Ram is 6 years elder then his brother and 5 years younger than her sister Sheena. When Sheena was born, her father's age was 24 and when Ram's brother was born his mother's age was 29. Find the difference between ages of Ram's father and his mother. Bother=x Ram=x+6 Sheena=x+11 Father=x+11+24=x+35

Mother=x+29

Difference=x+35 - (x+29)=6 years

- **Q.17.** If 6 years are subtracted from the present age of Babita and the remainder is divided by 18, then the present age of her granddaughter Geeta is obtained. If Geeta is 2 years younger to Sita whose age is 5 years, then what is Babita's present age? Geeta's age = (5-2) = 3 years Let age of Babita = x years So (x-6)/18 = 3Solve, x = 60
- Q.18. A's age is twice C' age. Ratio of age of B 2 years hence to age of C 2 years ago is 5 : 2. C is 14 years younger than D. Difference in ages of D and A is 4 years. Find the average of their ages.

A = 2C(B+2)/(C-2) = 5/2 C = D - 14D - A = 4Solve A = 20 B =

Solve, A = 20, B = 18, C = 10, D = 24

Q.19. Ratio of ages of A 5 years hence to B's age 3 years ago is 5 : 3. Also ratio of ages of A

4 years ago to B's age 2 years hence is 4 : 5. Find the age of the elder. (A+5)/(B-3) = 5/3 (A-4)/(B+2) = 4/5 Solve A = 20, B = 18

- Q.20. The respective ratio between the present ages of father, mother and daughter is 7 : 6 : 2. The difference between mother's and the daughter's age is 24 years. What is the father's age at present? Let the common ratio be x \therefore The percentages of father's, mother's and daughter's are 7x, 6x, 2x respectively. According to the question 6x - 2x = 244x = 24x = 6 \therefore father's present age = 7 × 6 = 42 years
- The average age of 9 students and their Q.21. teacher is 16 year. The average age of the first four students is 19 years and that of the last five is 10 years. Find the age of the teacher. Sum of the age of 10 persons (9 students + 1 teacher)= $10 \times 16 = 160$ years Sum of age of first 4 students = 4×19 = 76 years Sum of ages of last 5 students = 5×10 = 50 years Hence, the age of teacher will be = (Sum of age of all 10 persons) - (sum of age of 9 students) = 160 - (76 + 50) = 34 years' (Ans) Sum of the ages of Nitika and Kruti = 21 x 2 = 42 yearsRatio of Nitika : Kruti = 4 : 3 Kruti's age

Q.22. The ratio of the present ages of Jyoti and Amit is 8:9 After four years Jyoti's age will be 28 year What was Amit's age 8 years ago? Let X and y are the present ages of Jyoti and Amit respectively. Hence X:Y = 8:9 \Rightarrow X/Y = 8/9 \Rightarrow Y = 9X/8 Four years ago Jyoti's age = $28 \Rightarrow X + 4$ $= 28 \Rightarrow X = 24$ years Hence $Y = 9 \times 24 / 8 = 9 \times 3 = 27$ years. Amit's age 8 years ago = 27 - 8 = 19years Q.23. At present, the ratio of the ages of Maya and Chhaya is 6 : 5 and fifteen years from now, the ratio will get changed to 9:8. Maya's present age is Let Maya's and Chhaya's present ages be 6x and 5x respectively. After 15 years, Maya's age = (6x + 15) years Chhaya's age = (5x + 15) years Therefore, $\frac{6x+15}{5x+15} = \frac{9}{8}$ 8(6x + 15) = 9(5x + 15)48x + 120 = 45x + 13548x - 45x = 135 - 1203x = 15*x* = 5 \therefore Maya's present age = $6 \times 5 = 30$ years Hence, option C is correct. Q.24. I am three times as old as my son 15 years hence, I will be twice as old as my son. The sum of our ages is Let son's present age = x years \therefore My age = 3x years 15 years hence, Son's age = (x + 15) years My age = (3x + 15) years Therefore, (3x + 15) = 2(x + 15)

- 3x 2x = 30 15 x = 15 \therefore son's present age = 15 years My age = $15 \times 3 = 45$ years The required sum of their ages = 15 + 45 = 60 years Hence, option B is correct.
- Q.25. The ratio of the present ages of Tarun and Varun is 3 : 7. After 4 years Varun's age will be 39 years. What was Tarun's age 4 years ago?
 Varun's present age = 39 4 = 35 years So, Tarun's present age = 15 years Tarun's age 4 years ago = 11 years
- Q.26. The present age of Suraj is six times the age of Vijay. Also, Vijay's present age is 20 years less than Suraj's age. What is Suraj's present age?
- $\therefore Vijay's present age = X years$ $\therefore Suraj's present age = 6x years$ $\therefore 6x - x = 20$ 5x = 20 $x = \frac{20}{5} = 4$ $\therefore Suraj's present age = 6 \times 4 = 24 years$ Q.27. Ages of A and B are in the ratio of 2 : 3 respectively. 6 yr hence the ratio of their ages will become 8 : 11 respectively. What is B's present age? Let the age of A is x and that of B is y Acc. to question, $\therefore \frac{x}{y} = \frac{2}{3}$ $3x - 2y = 0 \dots (1)$

According to the second condition,

 $\frac{x+6}{y+6} = \frac{8}{11}$ 11x + 66 = 8y + 48 11x - 8y = -18.....(II)