

Problems on Ages

$$\frac{\text{Before Age}}{x-n} = \frac{\text{Present}}{x} = \frac{\text{After Age}}{x+n} \quad \text{Hence}$$

1. The present age of A & B are in the ratio 4:5 & after 5 yrs, they will be in the ratio 5:6. The present age of A is?  
 $4:5 = 6:5 \Rightarrow \frac{4x+5}{5x+5} = \frac{6x}{5x} \Rightarrow 2=5$   
 = 20 yrs.

2. The respective ratio of the present age of Swathi & Sruvya is 4:5. 6 years hence, the ratio will be 6:7, what is the difference between their ages?

$$= 3 \text{ yrs}$$

$$\frac{4x+6}{5x+6} = \frac{6}{7} \Rightarrow 28x+42 = 36x+36 \Rightarrow 6 = 2x \Rightarrow x = 3$$

3. The ratio of present age of two brothers is 1:2 & 5 years back the ratio was 1:3, what will be the ratio after 5 years?  
 $1:2 \Rightarrow \frac{1x-5}{2x-5} = \frac{1}{3} \Rightarrow 3x-15 = 2x-5 \Rightarrow x = 10$   
 $3:5$

4. The ratio of the present age of A & S is 12:17. Four years ago it was 11:15, what will be 6 years hence?

$$= 4:5$$

$$\frac{12x-4}{17x-4} = \frac{11}{15} \Rightarrow \frac{185x-60}{187x-68} = \frac{11}{15} \Rightarrow 187x-68 = 11(185x-60) \Rightarrow 187x-68 = 2035x-660 \Rightarrow 1846x = 592 \Rightarrow x = 10$$

5. 4 years ago, the ratio of the age of A & B was 2:3 & after 4 years it will become 5:7. Find the ratio of their present age.

$$= 9:13$$

$$= \frac{14x^2 + 28x + 8x + 16}{15x^2 + 20x + 12x + 16}$$

$$14x^2 + 36x = 15x^2 + 32x$$

$$0 = x^2 + 4x$$

$$x^2 = 4x \Rightarrow x = 4$$

$$\frac{2x+4}{3x+4} = \frac{5}{7} \Rightarrow \frac{2x+8}{3x+8} = \frac{5}{7}$$

$$\frac{2x+8}{3x+8} = \frac{5}{7}$$

$$\frac{4}{16}$$

$$\frac{10}{14}$$

6. The ratio of the age of two persons is 4:7 & age of one of them is greater than the other by 30 years. The sum of their ages is.

$$= 110$$

$$\frac{4x}{7x}$$

$$7x = 4x + 30$$

$$3x = 30$$

$$x = 10$$

7. Harsha is 40yo & Pithu is 60yo. How many years ago was the ratio of their ages 3:5  
= 10 years ago.

$$\frac{40-x}{60-x} = \frac{3}{5}$$

$$200x - 5x = 180 - 3x$$

$$20 - 2x = 0$$

$$x = 10$$

8. If the ratio of ages of A & B is 2:5 at present & 15 years from now it will be 7:13, find A's present age  
= 20 years

$$\frac{2x+15}{5x+15} = \frac{7}{13} \Rightarrow 26x+195 = 35x+105$$

$$90 = 9x \Rightarrow x = 10$$

9. Present ratio of P & Q is 3:5, 10 years ago it was 1:2. Find sum.  
= 80

$$\frac{3x-10}{5x-10} = \frac{1}{2} \Rightarrow 6x-20 = 5x-10 \Rightarrow x = 10$$

10. The ratio between present age is 21:19 & 6 years ago is 9:8. How old is someone if her present age is 12 years less than older's present age.  
= 26 years

$$\frac{21x-6}{19x-6} = \frac{9}{8} \Rightarrow 168x-48 = 172x-54$$

$$38 = 4x \Rightarrow x = 9.5$$

~~Twice/Thrice the age~~

Father age is three times  $\Rightarrow$

11. I am 3 times as old as my son. 15yrs hence, I will be twice as old as my son. The sum.  
= 60yrs.

$$\frac{x+15}{3x+15} = \frac{1}{2} \Rightarrow 2x+30 = 3x+15 \Rightarrow x = 15$$

12. The present age of a father is 3 years more than 3 times the age of his son. 3 years hence, father will be 10 years more than twice the age of his son. Father's age?  
= 38 years

$$x+3 = 3(2x+3) \Rightarrow x+3 = 6x+9 \Rightarrow -5x = 6 \Rightarrow x = -1.2$$

$$\frac{2x+3}{3x+3} = \frac{2}{3} \Rightarrow 6x+6 = 6x+6$$



13. If the age of A & C are added to thrice the age of B, the total becomes 59, if the age of B & C are added to thrice the age of A, the total becomes 68 & if the age of A is added to thrice the age of B and thrice the age of C, then total becomes 108. What is the age of A?

$$A + C + 3B = 59$$

$$3A + B + C + B = 68 \quad \times 3 \rightarrow 9A + 3B + 3C = 204 \Rightarrow A = 12$$

$$A + 3B + 3C = 108$$

$$1A + 3B + 3C = 108$$

$$8A = 96$$

14. If 3 taps are open together, a tank is filled in 10 hrs. One of the tap can fill in 5 hrs & another in 10 hrs. At what rate does 3rd pipe work?

$$x + y + z = 10 \text{ hrs}$$

$$x = 5 \text{ hrs} \Rightarrow \frac{W}{5} = x$$

$$y = 10 \text{ hrs} \Rightarrow \frac{W}{10} = y$$

$$10 \left( \frac{W}{5} + \frac{W}{10} + \frac{W}{z} \right) = W$$

$$10 \left( \frac{2x + x + 10}{10x} \right) = 1 \quad x = 3x + 10 \quad x = 5$$

$$\Rightarrow \frac{1}{5} + \frac{1}{10} + \frac{1}{z} = \frac{1}{10}$$

$$z = 10 - \frac{1}{\frac{1}{5} + \frac{1}{10}}$$

$$z = \frac{100 - 20}{10} = \frac{80}{10} = 8 \text{ hrs}$$

15. Tap 'M' alone can fill a tank completely in 8 hrs. Another tap 'N' alone can empty the same tank in 12 hrs. If both taps are opened simultaneously, in what time would tank get full?

$$M = 8 \text{ hrs} \Rightarrow \frac{W}{8}, \quad N = 12 \text{ hrs} \Rightarrow -\frac{W}{12}$$

$$2W = \left( \frac{W}{8} + \left( -\frac{W}{12} \right) \right) \times x \Rightarrow \frac{1}{8} - \frac{1}{12} \quad x = \frac{(12-8)}{12 \times 8} = \frac{4}{96} = \frac{1}{24}$$

$$x = 24 \text{ hrs}$$

16. There are 2 pipes in a tank. Pipe A is for filling the tank & pipe B is for emptying the tank. If A can fill the tank in 10 hrs & B can empty the tank in 15 hrs then find how many hrs will it take to completely fill a half empty tank.

$$A = \frac{W}{10}, \quad B = -\frac{W}{15} \Rightarrow \frac{n}{2} \left( \frac{W}{10} - \frac{W}{15} \right) = \frac{n(3W - 2W)}{2 \times 30} = \frac{W}{2}$$

$$\Rightarrow \frac{n}{2} = \frac{1}{2} \Rightarrow 15 \text{ hrs}$$

17. There are 3 taps A, B & C in a tank. They can fill the tank in 10 hrs, 20 hrs & 25 hrs. At first all of them are opened. Then after 2 hrs tap C is closed. After 4th hour, tap B is closed. Find the % of work done by tap A.

$$A = \frac{W}{10}$$

$$B = \frac{W}{20}$$

$$C = \frac{W}{25}$$

$$\frac{nW}{10} + \frac{4W}{20} + \frac{2W}{25} = W$$

$$\frac{n}{10} + \frac{2}{10} + \frac{4}{25} = 1$$

$$\frac{20}{10} + \frac{4}{25} + \frac{W}{25} = 1$$

$$\frac{5n+5+8}{50} = 1$$

$$5n+13 = 50$$

$$5n = 37$$

$$n = \frac{37}{5} = 7.4 \text{ hrs.}$$

$$n = \frac{36}{5}$$

$$\text{Percentage work} = \frac{n \times \frac{W}{10}}{W} \times 100 = \frac{36}{5} \times \frac{W}{10} \times 100 = \frac{36 \times 2}{5} = 72$$

Ans.