

Exercise 6(F)

1. Five years ago, A's age was four times the age of B. Five years hence, A's age will be twice the age of B. Find their present ages.

Solution:

Let the present age of A be taken as x years

And present age of B be taken as y years

Then according to the question, we have

Five years ago,

$$x - 5 = 4(y - 5)$$

$$x - 4y = -15 \dots (1)$$

Five years later,

$$x + 5 = 2(y + 5)$$

$$x - 2y = 5 \dots (2)$$

Now, on subtracting (1) from (2), we get

$$x - 2y = 5$$

$$x - 4y = -15$$

$$\begin{array}{r} (-) \quad (+) \quad (+) \\ \hline \end{array}$$

$$2y = 20$$

$$\Rightarrow y = 10$$

Now, substituting the value of y in (1), we get

$$x - 4(10) = -15$$

$$\Rightarrow x = 25$$

Thus, the present ages of A and B are 25 years and 10 years respectively.

2. A is 20 years older than B. 5 years ago, A was 3 times as old as B. Find their present ages.

Solution:

Let A's present age to be considered as x years

And B's present age be considered as y years

Then, according to the question, we have

$$x = y + 20$$

$$x - y = 20 \dots (1)$$

Five years ago,

$$x - 5 = 3(y - 5)$$

$$x - 3y = -10 \dots (2)$$

On subtracting (1) from (2), we get

$$x - 3y = -10 \dots (2)$$

$$x - y = 20 \dots (1)$$

$$\begin{array}{r} (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$-2y = -30$$

$$\Rightarrow y = 15$$

On substituting the value of y in (1), we get

$$x = 15 + 20$$

$$\Rightarrow x = 35$$

Thus, the present ages of A and B are 35 years and 15 years.

3. Four years ago, a mother was four times as old as her daughter. Six years later, the mother will be two and a half times as old as her daughter at that time. Find the present ages of mother and her daughter.

Solution:

Let the present age of the mother be considered as x years and the present age of the daughter be considered as y year

Then, according to the question, we have

$$x - 4 = 4(y - 4)$$

$$x - 4 = 4y - 16$$

$$x - 4y = -12 \dots (i)$$

And,

$$x + 6 = 2 \frac{1}{2} (y + 6)$$

$$x + 6 = \frac{5}{2}y + 15$$

$$x - \frac{5}{2}y = 9$$

$$2x - 5y = 18 \dots (ii)$$

On solving (i) and (ii), we get

$$y = 14 \text{ and } x = 44$$

Thus, the present age of the mother is 44 years and the present age of the daughter is 14 years.

4. The age of a man is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of his children at that time. Find the present age of the man.

Solution:

Let's consider the present age of the man to be x years

And let the sum of the ages of his two children be taken as y years

Then, according to the question, we have

$$x = 2y \dots (i)$$

$$\text{And, } x + 20 = y + 40 \dots (ii),$$

On substituting (i) in (ii), we get

$$2y + 20 = y + 40$$

$$\Rightarrow y = 20$$

Now, substituting the value of y in (i), we get

$$\Rightarrow x = 40$$

Thus, the present age of the man is 40 years.

5. The annual incomes of A and B are in the ratio 3 : 4 and their annual expenditure are in the ratio 5 : 7. If each Rs. 5000; find their annual incomes.

Solution:

Let consider A's annual income to be Rs. X and B's annual income to be Rs. y

Then, according to the question, we have

$$x/y = 3/4$$

$$4x - 3y = 0 \dots (1)$$

$$\text{And, } (x - 5000)/(y - 5000) = 5/7$$

$$7x - 5y = 10000 \dots (2)$$

Performing (1)×7 - (2)×4, we get

$$28x - 21y = 0$$

$$28x - 20y = 40000$$

$$\begin{array}{r} (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$-y = -40000$$

$$\Rightarrow y = 40000$$

On substituting the value of y in (1), we get

$$4x - 3(40000) = 0$$

$$\Rightarrow x = 30000$$

Thus, A's income in Rs. 30,000 and B's income is Rs. 40,000.

6. In an examination, the ratio of passes to failures was 4 : 1. Had 30 less appeared and 20 less passed, the ratio of passes to failures would have been 5 : 1. Find the number of students who appeared for the examination.

Solution:

Let's assume the number of pass candidates to be x

And, the number of failure candidates to be y

Then, according to the question, we have

$$x/y = 4/1$$

$$x - 4y = 0 \dots(1)$$

And,

$$(x - 20)/(y - 20) = 5/1$$

$$x - 5y = -30 \dots(2)$$

Performing (1) - (2), we get

$$x - 4y = 0$$

$$x - 5y = -30$$

$$\begin{array}{r} (-) \quad (+) \quad (+) \\ \hline \end{array}$$

$$y = 30$$

On substituting the value of y in (1), we get

$$x - 4(30) = 0$$

$$\Rightarrow x = 120$$

Thus, total students appeared is $(x + y) = 120 + 30$
 $= 150$

7. A and B both have some pencils. If A gives 10 pencils to B, then B will have twice as many as A. And if B gives 10 pencils to A, then they will have the same number of

pencils. How many pencils does each have?

Solution:

Let the number of pencils with A be assumed as x

And the number of pencils with B be assumed as y

If A gives 10 pencils to B, then

$$y + 10 = 2(x - 10)$$

$$2x - y = 30 \dots (1)$$

If B gives 10 pencils to A, then

$$y - 10 = x + 10$$

$$x - y = -20 \dots (2)$$

On subtracting (1) from (2), we have

$$x - y = -20$$

$$2x - y = 30$$

$$\begin{array}{r} (-) (+) (-) \\ \hline \end{array}$$

$$-x = -50$$

$$\Rightarrow x = 50$$

Now, substituting the value of x in (1), we get

$$2(50) - y = 30$$

$$\Rightarrow y = 70$$

Thus, A has 50 pencils and B has 70 pencils.

8. 1250 persons went to see a circus-show. Each adult paid Rs. 75 and each child paid Rs. 25 for the admission ticket. Find the number of adults and number of children, if the total collection from them amounts to Rs. 61,250.

Solution:

Let the number of adults be taken as x and the number of children as y

Then according to the question, we have

$$x + y = 1250 \dots (1)$$

And,

$$75x + 25y = 61250$$

$$\Rightarrow 3x + y = 2450 \dots (2)$$

On subtracting (1) from (2), we get

$$3x + y = 2450$$

$$x + y = 1250$$

$$\begin{array}{r} (-) (-) (-) \\ \hline \end{array}$$

$$2x = 1200$$

$$\Rightarrow x = 600$$

On substituting the value of x in (1), we get

$$600 + y = 1250$$

$$\Rightarrow y = 650$$

Thus, number of adults is 600 and the number of children is 650.

9. Two articles A and B are sold for Rs. 1,167 making 5% profit on A and 7% profit on A and 7% profit on B. IF the two articles are sold for Rs. 1,165, a profit of 7% is made on A and a profit of 5% is made on B. Find the cost prices of each article.

Solution:

Let's assume the cost price of article A as Rs. x and the cost price of articles B as Rs. y

Then, according to the question, we have

$$(x + 5\% \text{ of } x) + (y + 7\% \text{ of } y) = 1167$$

$$[x + (5/100)x] + [y + 7/100)y] = 1167$$

$$(21x/20) + (107y/100) = 1167$$

$$105x + 107y = 1167 \dots (1)$$

And,

$$(107x/100) + (105y/100) = 1165$$

$$107x + 105y = 116500 \dots (2)$$

On adding (1) and (2), we get

$$212x + 212y = 233200$$

$$x + y = 1100 \dots (3)$$

On subtracting (2) from (1), we get

$$-2x + 2y = 200$$

$$\Rightarrow -x + y = 200 \dots (4)$$

Now, subtracting (3) from (4), we get

$$-x + y = 100 \dots (4)$$

$$-x + y = 1100 \dots (3)$$

$$\underline{\hspace{1cm}} \\ 2y = 1200$$

$$\Rightarrow y = 600$$

On substituting the value of y in (3), we get

$$x + 600 = 1100$$

$$\Rightarrow x = 500$$

Thus, the cost price of article A is Rs. 500 and that of article B is Rs. 600.

10. Pooja and Ritu can do a piece of work in $17\frac{1}{7}$ days. If one day work of Pooja be three fourth of one day work of Ritu' find in how many days each will do the work alone.

Solution:

Let assume that Pooja's 1 day work = $1/x$ and Ritu's 1 day work = $1/y$

Then, according the question, we have

$$(1/x) + (1/y) = 7/120 \dots (1)$$

$$\text{And, } 1/x = (\frac{3}{4})(1/y)$$

$$y = (\frac{3}{4})x \dots (2)$$

Now, using the value of y from (2) in (1), we get

$$(1/x) + (4/3x) = 7/120$$

$$120(3 + 4) = 7(3x)$$

$$21x = 120(7)$$

$$\Rightarrow x = 40$$

On substituting the value of x in (2), we get

$$y = \left(\frac{3}{4}\right)(40) = 30$$

$$y = 30$$

Thus, Pooja will complete the work in 40 days and Ritu will complete the work in 30 days.



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