

No. **62**

Q) On the 1st day of the sale of tickets of a drama 35 tickets in all were sold. If the rates of the tickets were Rs.20 and Rs. 40 per ticket and the total collection was Rs. 900. Find the number of tickets sold of each rate.

Sol. Let the number of tickets of Rs.20 be x and the number of tickets of

How many total



per ticket Rs. 40 per tick

What do we have to find?

Since we don't know the number Let us assume sold of Rs. 20 and Rs. 40



tion,

$$40 \times y = 40y$$

The is a What is the total collection?

ts: y

Similarly, If I have x tickets of Rs. 20, then total collection will be?

(Q) On the 1st day of the sale of tickets of a drama 35 tickets in all were sold. If the rates of the tickets were Rs.20 and Rs. 40 per ticket and the total collection was Rs. 900. Find the number of tickets sold of each rate.

Sol. Let the number of tickets of Rs.20 be x and the number of tickets of Rs.40 be y

As per the 1st given condition,

$$x + y = 35 \quad \text{.....(i)}$$

As per the 2nd given condition,

$$20x + 40y = 900$$

Dividing throughout by 20, we get

$$x + 2y = 45 \quad \text{.....(ii)}$$

Subtracting (ii) from (i),

$$\begin{array}{r} \cancel{x} + y = 35 \\ \cancel{x} + 2y = 45 \\ (-) \quad (-) \quad \quad (-) \\ \hline -y = -10 \\ \hline \therefore y = 10 \end{array}$$

Substituting $y = 10$ in (i),

$$x + 10 = 35$$

$$\therefore x = 35 - 10$$

$$\therefore x = 25$$

The number of tickets sold at Rs.20 and Rs.40 each are 25 tickets and 10 tickets respectively.

No. **63**

(Q) Durga's mother gave some ten Rupee notes and some 5 rupee notes to her which amounts to Rs. 190. Durga said, 'if the number of 10 rupee notes would have been interchanged, I would have Rs. 185. So how many notes of rupee 10 and rupee 5 were given to her?

And the question is: How many types of notes

Let us understand the sum with the help of a table

Sol. Let the number of notes of Rs. 10 be x and number of notes of rupees 5 be y

No.	5 rupee note	10 rupee note	notes of rupees 10	total
				
	10x	5y		185

Note

Rs. 10 Note

As per the 1st given condition, $10x + 5y = 190$ As per the 2nd given condition, $5x + 10y = 185$

$$10x + 5y = 190$$

$$5x + 10y = 185$$

Dividing throughout by 5, we get

Dividing throughout by 5, we get

$$2x + y = 38 \dots\dots (i)$$

$$x + 2y = 37 \dots\dots (ii)$$

(Q) Durga's mother gave some ten Rupee notes and some 5 rupee notes to her, which amounts to Rs. 190. Durga said, 'if the number of 10 rupee notes and 5 rupee notes would have been interchanged, I would have Rs. 185 in my hand.'
So how many notes of rupee 10 and rupee 5 were given to Durga?

Sol. Let the number of notes of Rs. 10 be x and number of notes of Rs. 5 be y

As per the 1st given condition,

$$2x + y = 38 \quad \text{.....(i)}$$

$$\therefore y = \frac{36}{3}$$

As per the 2nd given condition,

$$x + 2y = 37 \quad \text{.....(ii)}$$

$$\therefore y = 12$$

Substituting $y = 12$ in (ii),

Multiplying (ii) by 2, we get

$$2x + 4y = 74 \quad \text{.....(iii)}$$

$$x + 2(12) = 37$$

$$x + 24 = 37$$

Subtracting (i) from (iii),

$$\cancel{2x} + 4y = 74$$

$$\therefore x = 37 - 24$$

$$\cancel{2x} + y = 38$$

$$\therefore x = 13$$

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

$$3y = 36$$

Durga has 13 notes of Rs.10 and 12 notes of Rs.5

No. **64**

Problems based on Age

(vi) Five years hence, the age of Jacob will be three times that of his son.

Five years ago, Jacob's age was seven times of his son.

What are their present ages?

Soln. Let the present age of Jacob be 'x' years
and present age of his son be 'y' years.

What do we have to
find ?

and his son

According to the second condition,

$$(x - 5) = 7(y - 5)$$

$$\therefore x - 5 = 7y - 35$$

$$\therefore x - 7y = -30$$

... (ii)

Solve the equations by
either Substitution or
Elimination Method

$$y = 10$$

Putting $y = 10$ in (i)

$$x = 40$$

\therefore Age of Jacob is 40 years

	Age of Jacob	Age of his Son
Present age	x	y
Five years hence	(x + 5)	(y + 5)
Five years ago	(x - 5)	(y - 5)

- (ii) Five years ago, Nuri was thrice as old as Sonu.
Ten years later, Nuri will be twice as old as Sonu.
How old are Nuri and Sonu?

Soln. Let the present age of Nuri be 'x' years
 and present age of his Sonu be 'y' years.

According to the first condition,

$$y = 20$$

Substituting $y = 20$ in (i)

$$x = 50$$

\therefore Age of Nuri is 40 years

Solve the equations by
 either Substitution or
 Elimination Method

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

$$\therefore x + 10 = 2y + 20$$

$$\therefore x - 2y = 10 \quad \dots (ii)$$

	Age of Nuri	Age of Sonu
Present age	x	y
Five years ago	(x - 5)	(y - 5)
Ten years Later	(x + 10)	(y + 10)

No. **65**

Problems based on Age

Q. Ten years ago father was 12 times as old as his son at that time and 10 years hence he will be twice as old as his son. Find their present ages.

Sol. Let present age of Father be 'x' years and that of Son be 'y' years.

Present age	x
10 Years ago	x - 10
10 years hence	x + 10

Since the coefficients are same we will subtract the two equations

Here the coefficient of X is

in (i) and

$$x - y = 20 - 10$$

$$x - 2y = 10 \quad \text{.....(ii)}$$

Subtracting (ii) from (i)

Substituting y=10 in(ii), we get

$$\therefore x - 2(10) = 10$$

$$\therefore x = 10 + 20$$

$$\therefore x = 30$$

The present age of father is 30 years and the age of son is 10 years

As per the first condition

$$(x - 10) = 12 \times (y - 10)$$

$$\therefore x - 10 = 12y - 120$$

$$\therefore x - 12y = -120 + 10$$

$$x - 12y = -110 \quad \text{.....(i)}$$

Number it as equation (i)

$$x - 12y = -110$$

$$x - 2y = 10$$

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

$$-10y = -100$$

$$\therefore y = 10$$

No. **66**

$$\text{Husband + wife} = 4 \times \text{sum of the ages of children}$$

Q. The sum of ages of husband and his wife is four times the sum of ages of their children. Four years ago, the ratio of sum of their ages to the sum of ages of their children was 18 : 1. Two years hence the ratio will be 3 : 1. How many children do they have ?

Sol.

How do we get
+ 4 ?

	Husband	Wife	Sum of ages of husband and wife
Present	40	35	75
4 years ago	$40 - 4$	$35 - 4$	$75 - 8(4)$
2 years hence	$40 + 2$	$35 + 2$	$75 + 4(2)$

i.e, number of people
×
years we consider

x
and

- Q. The sum of ages of husband and his wife is four times the sum of ages of their children.
 Four years ago, the ratio of sum of their ages to the sum of ages of their children was 18 : 1.
 Two years hence the ratio will be 3 : 1. How many children do they have ?

Acc

Sum of the ages of

By cross
multiplication

Number it as eq.(ii)

Number it as eq.(i)

According to the second condition,

$$\frac{4x + 4}{3x + 6y} = \frac{3}{1}$$

$$4 = 3(x + 2y)$$

$$3x + 6y$$

$$= -4$$

$$-6y = -4$$

.....(ii)

Dividing throughout by 2 , we get

$$-7x + 36y = 4 \quad \text{.....(i)}$$

- Q. The sum of ages of husband and his wife is four times the sum of ages of their children.
Four years ago, the ratio of sum of their ages to the sum of ages of their children was 18 : 1.
Two years hence the ratio will be 3 : 1. How many children do they have ?**

Multiplying (ii) by 7 we get,

$$7(x - 6y) = 7 \times -4$$

$$\therefore 7x - 42y = -28$$

Adding (i) and (iii),

$$\cancel{-7x} + 36y = 4$$

$$\cancel{7x} - 42y = -28$$

$$-6y = -24$$

$$\therefore y = 4$$

\therefore They had 4 childrens.

First in this sum will have to either make the coefficient of X same or Y same

Here, in the equation (i) and (iii) the signs are different so, we will add these two equations

same we will have to multiply equation (ii) by 7.

No. **67**

Q] When the son will be as old as his father today, the sum of their ages then will be 126. When the father was as old as his son is today, the sum of their ages then was 38. Find their present ages.

Sol.

	Father	Son	Difference
Present Age	x yrs	y yrs	(x - y)
Future	x + (x - y)	x yrs	
PAST	y yrs	y - (x - y)	

As per the First condition,

$$\begin{aligned}
 x + (x - y) + x &= 126 \\
 \therefore x + x - y + x &= 126 \\
 \therefore 3x - y &= 126 \quad \text{.....(i)}
 \end{aligned}$$

As per the Second condition,

$$\begin{aligned}
 y + y - (x - y) &= 38 \\
 \therefore y + y - x + y &= 38 \\
 \therefore -x + 3y &= 38 \quad \text{.....(ii)}
 \end{aligned}$$

	Father	Son
Present Age	50 yrs	30 yrs
Future	50 + (50 - 30) Age Difference	50 yrs
Past	30 yrs	30 - (20) Age Difference

Q] When the son will be as old as his father today, the sum of their ages then will be 126. When the father was as old as his son is today, the sum of their ages then was 38. Find their present ages.

Sol.

$$3x - y = 126 \quad \text{.....(i)}$$

$$-x + 3 = 38 \quad \text{.....(ii)}$$

Multiplying (ii) by 3,

$$-3x + 9y = 114 \quad \text{.....(iii)}$$

Adding (i) and (iii),

$$\begin{array}{r} \cancel{3x} - y = 126 \\ -\cancel{3x} + 9y = 114 \\ \hline 8y = 240 \end{array}$$

$$\therefore y = \frac{240}{8}$$

$$\therefore y = 30$$

Substituting $y = 30$ in (i)

$$3x - 30 = 126$$

$$\therefore 3x = 126 + 30$$

$$\therefore 3x = 156$$

$$\therefore x = \frac{156}{3}$$

$$\therefore x = 52$$

The present age of father and son is 52 years and 30 years respectively.

No. **68**

Problems based on Geometry

(v) The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units.

If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units.

Find the dimensions of the rectangle.

Let the length of the rectangle be x units and breadth be y units

\therefore Area of the rectangle = Length \times Breadth = xy square units

According to the first condition

New Area = $(xy - 9)$ square units

New Length = $(x - 5)$ units

New Breadth = $(y + 3)$ units

$$\therefore (x - 5)(y + 3) = (xy - 9)$$

$$\therefore \cancel{xy} + 3x - 5y - 15 = \cancel{xy} - 9$$

$$\therefore 3x - 5y - 15 = -9$$

$$\therefore 3x - 5y = 6 \quad \dots \text{ (i)}$$

According to the first condition

New Area = $(xy + 67)$ square units

New Length = $(x + 3)$ units

New Breadth = $(y + 2)$ units

$$\therefore (x + 3)(y + 2) = (xy + 67)$$

$$\therefore \cancel{xy} + 2x + 3y + 6 = \cancel{xy} + 67$$

$$\therefore 2x + 3y + 6 = 67$$

$$\therefore 2x + 3y = 61 \quad \dots \text{ (ii)}$$

Area of a rectangle = $L \times B$

No. **69**

Q. Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36m. Find the dimensions of the rectangle.

Sol : Let the length of rectangle be x m and breadth be y m.

According to the first condition,

$$\frac{1}{2} \times [2(x + y)] = 36$$

$$\therefore x + y = 36 \quad \dots (i)$$

According to the second condition,

$$x = y + 4 \quad \dots (ii)$$

Now to represent graphically, we take x as horizontal axis and y as vertical axis. We plot two solutions of each equation

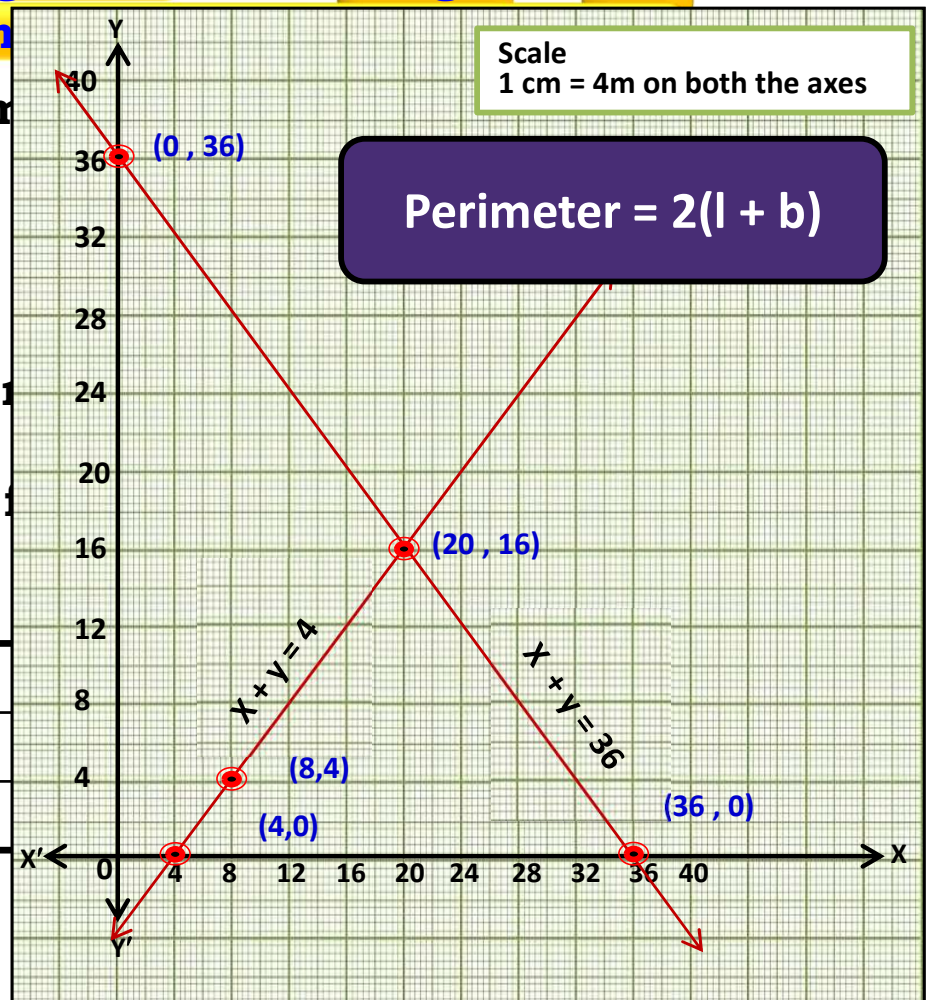
$$x + y = 36$$

$$x = y + 4$$

x	0	36
y	36	0
(x, y)	(0, 36)	(36, 0)

x	8	4
y	4	0
(x, y)	(8, 4)	(4, 0)

The length of rectangle is 20m and breadth of rectangle is 16m.



No. **70**

Problems based on Speed, Distance and Time

Places A and B are 100km apart on a highway.

One car starts from A and another from B at the same time.

Q)

If the cars travel in the same direction with different speeds they meet in 5 hours.

If they travel towards each other, they meet in 1 hours.

What is the speed of both the cars.

Sol. Let the speed of the car starting from A be x km/hr and speed of the car starting from B be y Km/hr



A

100 KM

B

C

According to

Distance

Distance

Distance

Also, from

$$AB + BC = AC$$

Hence

$$100 + 5y = 5x$$

Dividing throughout by 5

$$20 + y = x$$

$$\therefore x = 20 + y \dots (i)$$

\therefore Speed of Car starting from A is 60 Km/hr and from B is 40 Km/hr

Solve the equations with either substitution or elimination method

addition

Distance

starting from

Speed of Car starting from

B is y km / hr

Time taken = 1 Hour

Hence Distance BC = y Km

Hence

$$x + y = 100 \dots (ii)$$

$$y = 40$$

Substituting $y = 40$ in (i)

$$x = 60$$



A

100 KM

C



B

Thank You