

DAY 8

1. The sum of a two digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many numbers are there?

Sol: Given **(A two digit number) + (number obtained by reversing the digits) = 66.**
and **Difference of digits of the number = 2**

Let unit's place digit be x and ten's place digit be y

So Two digit number = y tens + x units = $10y + x$

If digits are reversed then number = x tens + y units = $10x + y$

First Equation: $(10y + x) + (10x + y) = 66 \Rightarrow 11x + 11y = 66$
 $\Rightarrow x + y = 6 \dots \dots \dots \text{i)}$ {Divide both sides by 11}

Second Equation:- $x - y = 2 \dots \dots \dots \text{ii)}$ {here $y - x = 2$ also can be taken}

Add i) and ii), we get $(x + y) - (x - y) = 6 + 2$

$$\Rightarrow 2x = 8 \Rightarrow x = 4$$

Replace this value of x in i), we get

$$\text{i)} \Rightarrow 4 + y = 6 \Rightarrow y = 6 - 4 = 2$$

$$\therefore \text{Two digit number is } 10y + x = 10 \times 2 + 4 = 20 + 4 = 24$$

If we take $y - x = 2$ then two digit number is **42**.

So there are two numbers **24 and 42** which satisfy the given conditions.

2. A number consisting of two digits is seven times the sum of its digits. When 27 is subtracted from the number the digits are reversed, find the number.

Sol: Given **(A two digit number) = 7(sum of digits).**
and **(A two digit number) - 27 = (Number obtained by reversing the digits)**

Let unit's place digit be x and ten's place digit be y

So Two digit number = y tens + x units = $10y + x$

If digits are reversed then number = x tens + y units = $10x + y$

First Equation: $(10y + x) = 7(x + y) \Rightarrow 10y + x = 7x + 7y$
 $\Rightarrow 10y - 7y = 7x - x \Rightarrow 3y = 6x \Rightarrow y = 2x \dots \dots \dots \text{i)}$

Second Equation:- $(10y + x) - 27 = (10x + y) \Rightarrow 10y + x - 10x - y = 27$
 $\Rightarrow 9y - 9x = 27 \Rightarrow y - x = 3$ {Divide both sides by 9}
 $\Rightarrow 2x - x = 3$ {By i), $y = 2x$ }

$$\Rightarrow x = 3 \text{ Put value of } x \text{ in i), we get}$$

$$\text{i)} \Rightarrow y = 2x = 2(3) = 6$$

$$\therefore \text{Two digit number is } 10y + x = 10 \times 6 + 3 = 60 + 3 = 63$$

3. The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is ₹105 and for a journey of 15 km, the charge paid is ₹ 155. What are the fixed charges and the charge per km?

Sol:- Given taxi charges consists of a **fixed charge** together with the **charges for the distance covered**

Let the fixed charges = ₹ x & charges for distance covered = ₹ y

First Equation:- Charges paid for distance of 10 km = ₹105

Fixed charges + charges for 10 km distance = 105

$$x + 10y = 105 \dots \dots \dots \text{i)}$$

Second Equation:- Charges paid for distance of 15 km = ₹155

Fixed charges + charges for 15 km distance = 105

$$x + 15y = 155 \dots \dots \dots \text{ii)}$$

Subtract i) from ii), we get

$$\Rightarrow (x + 15y) - (x + 10y) = 155 - 105$$

$$\Rightarrow x + 15y - x - 10y = 50 \quad \Rightarrow 5y = 50 \quad \Rightarrow y = \frac{50}{5} = 10$$

Replace value of y in equation i), we get

$$\text{i)} \Rightarrow x + 10y = 105 \quad \Rightarrow x + 10(10) = 105$$

$$\Rightarrow x = 105 - 100 = 5$$

Fixed charges be ₹ 5 and charges per km be ₹ 10

EXERCISE

1. Exercise 3.4, Q 2 (iii)
2. Exercise 3.4, Q 2(v)
3. Exercise 3.5, Q 4(i)