

10th CBSE MATHS PRACTICE QUESTION

ANSWERS

- 99) On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$ find out whether the following pairs of linear equations are consistent, or inconsistent.
 $2x - 3y = 8$; $4x - 6y = 9$

Answer : The given equations can be rewritten as

$$2x - 3y - 8 = 0 \text{ and } 4x - 6y - 9 = 0$$

On comparing with standard form of pair of linear equations, we get

$$a_1 = 2, b_1 = -3, c_1 = -8$$

$$\text{and } a_2 = 4, b_2 = -6, c_2 = -9$$

$$\text{Now, } \frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}, \frac{b_1}{b_2} = \frac{-3}{-6} = \frac{1}{2} \text{ and } \frac{c_1}{c_2} = \frac{-8}{-9} = \frac{8}{9}$$

$$\text{Thus, } \frac{1}{2} = \frac{1}{2} \neq \frac{8}{9} \text{ i.e., } \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

Hence, the pair of linear equations is inconsistent.

- 100) On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$ find out whether the following pair of linear equations are consistent, or inconsistent.
 $\frac{3}{2}x + \frac{5}{3}y = 7$; $9x - 10y = 14$

Answer : $\frac{3}{2}x + \frac{5}{3}y = 7, 9x - 10y = 14$

$$\text{Here, } \frac{a_1}{a_2} = \frac{3}{2 \times 9} = \frac{1}{6}, \frac{b_1}{b_2} = -\frac{5}{3 \times 10} = -\frac{1}{6}, \frac{c_1}{c_2} = \frac{-7}{-14} = \frac{1}{2}$$

$$\therefore \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$\therefore$ Pair of equations is consistent with unique solution

- 105) A man has Rs. 100 in Rs.1 coins and 50 paise coins. All the 50 paise coins are worth as much as all the Rs.1 coins. How many coins of each he has?

Answer : Let the number of Rs.1 and 50 paise coins be x and y, respectively.

$$\text{Then } x + \frac{1}{2}y = 100 \dots (i)$$

$$\text{and } x = \frac{1}{2}y \dots (ii)$$

$$\text{Then, from Eq. (i), } \frac{1}{2}y + \frac{1}{2}y = 100 \Rightarrow y = 100$$

$$\therefore \text{ From Eq. (ii), } x = \frac{1}{2} \times 100 = 50$$

Hence, Rs.1 coins=50, 50 paise coins=100

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- 121) What should be the value of λ , for the given equations to have infinitely many solutions?

$$5x + \lambda y = 4 \text{ and } 15x + 3y = 12$$

Given, pair of equations is

$$5x + \lambda y = 4$$

$$\text{and } 15x + 3y = 12$$

$$\text{Here, } \frac{a_1}{a_2} = \frac{5}{15} = \frac{1}{3}, \quad \frac{b_1}{b_2} = \frac{\lambda}{3}$$

$$\text{and } \frac{c_1}{c_2} = \frac{-4}{-12} = \frac{1}{3}$$

Condition for infinitely many solutions is

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\Rightarrow \frac{1}{3} = \frac{\lambda}{3} = \frac{1}{3} \Rightarrow \lambda = 1$$

- 122) For which value of p , the pair of equations $6x + 5y = 4$ and $12x + py = -8$ has no solution?

Given pair of equations is

$$6x + 5y = 4 \text{ and } 12x + py = -8$$

$$\text{Here, } a_1 = 6, b_1 = 5, c_1 = -4$$

$$\text{and } a_2 = 12, b_2 = p, c_2 = -8$$

For no solution,

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\Rightarrow \frac{6}{12} = \frac{5}{p} \neq \frac{-4}{-8}$$

$$\Rightarrow p = 10$$

- 129) There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to B. But if 20 students are sent from B to A, the number of students in A becomes double the number of students in B. Find the number of students in the two halls.

Answer : Let the number of students in halls A and B be x and y , respectively.

According to the question,

$$x - 10 = y + 10 \Rightarrow x - y = 20 \quad \dots(i)$$

$$\text{and } (x + 20) = 2(y - 20) \Rightarrow x - 2y = -60 \quad \dots(ii)$$

On subtracting Eq. (ii) from Eq. (i), we get

$$-y + 2y = 60 + 20 \Rightarrow y = 80$$

On putting $y = 80$ in Eq. (i), we get

$$x - 80 = 20 \Rightarrow x = 20 + 80 \Rightarrow x = 100$$

Hence, there are 100 students in hall A and 80 students in hall B.

- 192) Sum of two numbers is 105 and their difference is 45. Find the numbers.

Answer : Given, sum of two numbers is 105 and their difference is 45.

Let the two numbers be x and y . ($x > y$)

$$\therefore x + y = 105 \quad \dots(i)$$

$$\text{and } x - y = 45 \quad \dots(ii)$$

On adding Eqs. (i) and (ii), we get

$$2x = 150 \Rightarrow x = 75$$

On putting the value of x in Eq. (i), we get

$$75 + y = 105 \Rightarrow y = 30$$

Hence, the numbers are 75 and 30.

The difference between two numbers is 26 and one number is three times the other. Find the numbers.

Answer : Let the two numbers be x and y ($x > y$)

We are given that,

$$x - y = 26 \quad \dots\dots(i)$$

$$\text{and } x = 3y \quad \dots\dots(ii)$$

On substituting x from eqn. (ii) in eqn. (i), we get

$$3y - y = 26$$

$$\Rightarrow 2y = 26$$

$$\therefore y = 13$$

On substituting $y = 13$ in eqn. (ii), we get

$$x = 3 \times 13 = 39$$

$$\therefore x = 39$$

Hence, the two numbers are 39 and 13.

- 218) A and B each have a certain number of mangoes. A says to B, if you give 30 of your mangoes. I will have twice as many as left with you. B replies, if you give me 10, I will have thrice as many as left with you. How many mangoes does each have?

Answer : Suppose, A has x mangoes and B has y mangoes.

According to the question,

$$x+30=2(y-30)$$

$$\Rightarrow x+30=2y-60$$

$$\Rightarrow x-2y=-90 \quad \dots(i)$$

$$\text{and } y+10=3(x-10)$$

$$\Rightarrow 10+30=3x-y$$

$$\Rightarrow 3x-y=40 \quad \dots(ii)$$

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

$$x=34 \text{ and } y=62$$

Hence, A has 34 mangoes and B has 62 mangoes.

- 293) A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and it becomes $\frac{1}{2}$ when 1 is subtracted from the denominator. Find the fraction

Answer : Let the fraction = $\frac{x}{y}$

According to question,

$$\frac{x-2}{y} = \frac{1}{3} \Rightarrow 3(x-2) = y$$

$$\therefore y=3x-6 \quad \dots(i)$$

$$\text{Also, } 2x=y-1 \quad \dots(ii)$$

Put the value of y in Eq. (ii), we get

$$2x = 3x - 6 - 1$$

$$2x = 3x - 7$$

$$\therefore x=7$$

Since, $y = 3x - 6$ [from Eq. (i)]

$$= 3(7) - 6 \quad [\text{put the value of } x]$$

$$= 21 - 6 = 15$$

$$\text{Thus, the fraction} = \frac{x}{y} = \frac{7}{15}$$

- 297) Points A and B are 70 km apart on a highway. A car starts from A and another car starts from B simultaneously, if they travel in same direction, they meet in 7 hr, but if they travel towards each other, they meet in 1 hr. Find the speed of two cars.

Answer : Let the speed of car starts from A is x km/h and the speed of car starts from B is y km/h.

Distance between A and B = 70 km

Distance travelled by car starts from A in 7 hr = $7x$

Distance travelled by car starts from B in 7 hr = $7y$

$$\therefore 7x - 7y = 70 \Rightarrow x - y = 10$$

Distance travelled by car starts from A in 1 hr = x

Distance travelled by car starts from B in 1 hr = y

$$\therefore x + y = 70$$

Solved by cross-multiplication method

$$x = 40 \text{ km/h}, y = 30 \text{ km/h}$$

- 390) Form the pair of linear equations for the following problems and find their solution by substitution method.

A fraction becomes $\frac{9}{11}$, if 2 is added to both the numerator and the denominator. If 3 is added to both the numerator and the denominator it becomes $\frac{5}{6}$. Find the fraction.

Answer : Let $\frac{x}{y}$ be the fraction, where x and y are positive integers.

$$\text{Given, } \frac{x+2}{y+2} = \frac{9}{11} \text{ and } \frac{x+3}{y+3} = \frac{5}{6}$$

$$\Rightarrow 11 \times (x + 2) = 9 \times (y + 2)$$

$$\Rightarrow 11x + 22 = 9y + 18$$

$$\Rightarrow 11x - 9y + 4 = 0$$

$$\Rightarrow 6 \times (x + 3) = 5 \times (y + 3)$$

$$\Rightarrow 6x + 18 = 5y + 15$$

$$\Rightarrow 6x - 5y + 3 = 0$$

The required equations are:

$$11x - 9y + 4 = 0 \quad \dots(i)$$

$$\text{and } 6x - 5y + 3 = 0 \quad \dots(ii)$$

$$\text{From eqn. (ii), } 5y = 6x + 3$$

$$\Rightarrow y = \frac{6x+3}{5} \quad \dots(iii)$$

On substituting y from eqn. (iii) in eqn. (i),

$$11x - 9 \times \left(\frac{6x+3}{5} \right) + 4 = 0$$

$$\Rightarrow 55x - 9 \times (6x + 3) + 20 = 0$$

$$\Rightarrow 55x - 54x - 27 + 20 = 0$$

$$\therefore x = 7$$

On substituting $x = 7$ in eqn. (iii),

$$y = \frac{6 \times 7 + 3}{5}$$

$$\therefore y = 9$$

Hence, the fraction $\frac{x}{y}$ is $\frac{7}{9}$

- 393) Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method :
 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?

Answer : Let the present age of Nuri be x yr and the present age of Sonu be y yr.

5 yr ago, Nuri's age = $(x - 5)$ yr

and Sonu's age = $(y - 5)$ yr

According to the question, $x - 5 = 3(y - 5)$

$$\Rightarrow x - 3y = -10 \quad \dots(i)$$

After 10 yr, Nuri's age = $(x + 10)$ yr

and Sonu's age = $(y + 10)$ yr

According to the question,

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

On subtracting Eq. (i) from Eq. (ii), we get

$$(x - 2y) - (x - 3y) = 10 + 10 \Rightarrow -2y + 3y = 20 \Rightarrow y = 20$$

On substituting $y = 20$ in eq. (ii), we get

$$x - 2 \times 20 = 10 \Rightarrow x = 50$$

Therefore, present age of Nuri is 50 yr and present age of Sonu is 20 yr.

- 406) 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 such numbers are there?

Answer : Let the ten's and the unit's digits in the first number be x and y , respectively. So, the first number may be written as $10x + y$ in the expanded form (for example, $56 = 10(5) + 6$).

When the digits are reversed, x becomes the unit's digit and y becomes the ten's digit. This number, in the expanded notation is $10y + x$ (for example, when 56 is reversed, we get $65 = 10(6) + 5$).

According to the given condition.

$$(10x + y) + (10y + x) = 66$$

$$\text{i.e., } 11(x + y) = 66$$

$$\text{i.e., } x + y = 6 \quad \dots(1)$$

We are also given that the digits differ by 2, therefore,

$$\text{either, } x - y = 2 \quad \dots(2)$$

$$\text{or } y - x = 2 \quad \dots(3)$$

If $x - y = 2$, then solving (1) and (2) by elimination, we get $x = 4$ and $y = 2$.

In this case, we get the number 42.

If $y - x = 2$, then solving (1) and (3) by elimination, we get $x = 2$ and $y = 4$.

In this case, we get the number 24.

Thus, there are two such numbers 42 and 24.

Verification : Here $42 + 24 = 66$ and $4 - 2 = 2$. Also $24 + 42 = 66$ and $4 - 2 = 2$.