BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT: MATHEMATICS

CHAPTER-3

TOPIC: Pair of Linear Equations in Two Variables

STEP 1:   **GUIDELINES AND INTRODUCTION**

Dear students, kindly refer to the following notes/video links for the Chapter- "Pair of Linear Equations in Two Variables" and thereafter do the questions in your Math notebook.

 (Chapter3 – Part 4)

Link for the chapter:-<http://ncert.nic.in/textbook/textbook.htm?jemh1=3-15>

Introduction: We have already learnt the graphical and algebraic methods of finding the solution of a pair of linear equations in two variables.

Today, we are going to learn an important concept of finding unknown (for example k) in the following system of linear equations.

kx +3y+7 =0

3x+ 4y +8 =0, given the system has infinitely many solutions/no solution/ unique solution. (Based on Exercise 3.5, Q2)

STEP 2:

SUBTOPIC:

Finding k if the pair of equation has infinitely many solutions/ no solution/ unique solution.

STEP 3:-

 Key points and important links for your reference:-

Look at the following question before attempting the assignment questions in your register.

Q-1.Find the value of k for which the following system of equations has a unique solution:

 x + 4y = 5

3x + ky = 1

Solution:

The given system of equations is:

x + 4y – 5 = 0

3x +k y – 1 = 0

The above equations are of the form:

$a_1 x + b_1 y + c_1 = 0$

$a_2\,x + b_2\,y + c_2 = 0$

Here, $a_1 = 1$, $b_1 = 4$, $c_1 = -5$

$a_2 = 3$, $b_2 = k$, $c_2 = -1$

Now $a_1 / a_2 = 1/3$, $b_1 / b_2 = 4/k$

Condition for unique solution is:

$a_1 / a_2 \neq b_1 / b_2$

$$\frac{1}{3} \neq \frac{4}{k}$$

$\Rightarrow k \neq 12$. **Thus, the system has unique solution when k≠12**

Hence, the given system of equations will have unique solution for all real values of k other than 12. (Answer statement)

Note- Attempt assignment question 1 now.

Q2- *Find k if the system has no solution.*

Check the link:- **https://youtu.be/919CjHLj1s4ck**

You can ignore the 3rd equality as shown below:

$kx + 3y = 3$

$12x + ky = 6$

For no solution $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

$\Rightarrow \quad \dfrac{k}{12} = \dfrac{2}{k} \neq \dfrac{3}{6}$

$\dfrac{k}{12} = \dfrac{3}{k}$

$k^2 = 36$

$k = \pm 6 \, i.e., \quad k = 6, -6$

Also,

$\dfrac{3}{k} \neq \dfrac{3}{6}$

$\dfrac{3 \times 6}{3} \neq k$

$k \neq 6$

$k = -6$ satisfies both the condition

Hence, $k = -6$

Q3- Find the value of k for which the following system of equations has infinitely many solutions.

The given system of equations is:

$(k - 1)x + 3y = 7$ ......(i)

$(k + 1)x + 6y = 5k - 1$ .....(ii)

Here, for infinitely *solutions,* $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

$\frac{k-1}{k+1} = \frac{3}{6} = \frac{7}{5k-1}$

now, $\frac{k-1}{k+1} = \frac{3}{6}$

$\Rightarrow 6(k - 1) = 3(k + 1)$

$\Rightarrow 6k - 6 = 3k + 3$

$\Rightarrow 6k - 3k = 3 + 6$

$\Rightarrow 3k = 9$

$\Rightarrow k = 3$

and $\frac{3}{6} = \frac{7}{5k-1}$

$\Rightarrow 3(5k - 1) = 7 * 6$

$\Rightarrow 15k - 3 = 42$

$\Rightarrow 15k = 45$

$\Rightarrow k = 3$

Thus for k=3, $a_1 / a_2 = b_1 / b_2 = c_1 / c_2$

STEP 4:   Points to Remember

i)   Refer to the solutions given above to solve the question.

ii)   Presentation of questions should be given utmost importance.

ASSIGNMENT:

Q-Find k if the following system has i) unique solution ii) no solution iii) infinitely many solutions.

 4x + ky + 8 = 0

   2x – y = 12

NOTE: Do Exercise 3.5, Q2 (all the parts)