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Subject: - Mathematics

Solution of a Pair of Linear Equations in Two Variables

HOMOGENEOUS SYSTEM OF EQUATIONS

The system of equations
 $a_1x + b_1y = 0$
 $a_2x + b_2y = 0$

(i) When $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ then $x = 0$ and $y = 0$.

(ii) When $\frac{a_1}{a_2} = \frac{b_1}{b_2}$ then an infinite many number of solutions (non zero solutions).

Q. Find the value of k for which the system of equations

$$3x + 5y = 0$$

$$kx + 10y = 0 \text{ has non zero solution.}$$

Solution:- If equations having non zero solution

$$\text{then } \frac{a_1}{a_2} = \frac{b_1}{b_2}$$

$$\Rightarrow \frac{3}{k} = \frac{5}{10}$$

$$\therefore k = 6 \quad \text{Hence the required value of } k = 6 \text{ \underline{Ans}}$$

Q. Find the value of k for which each of the following system of equations has no solution.

$$\text{(i) } \begin{cases} 8x + 5y = 9 \\ kx + 10y = 15 \end{cases}$$

$$\text{(ii) } \begin{cases} kx + 3y = k - 3 \\ 12x + ky = k \end{cases}$$

$$\text{(iii) } \begin{cases} kx + 3y = 3 \\ 12x + ky = 6 \end{cases}$$

Q. Find the value of k for which the system of equations has a non zero solution.

$$\text{(i) } 5x - 3y = 0$$

$$\text{(ii) } 4x - 3y = 0$$