Chapter-5
Matrix based system of Linear Equation

Exercise - 5.1

1. By drawing graphs or otherwise, classify each of the following systems:

a.
$$4x - 3y = -6$$
$$-4x + 2y = 16$$

Solution:

Given, $4x - 3y = -6$ ——①

$-4x + 2y = 16$

or, $-2x + y = 8$ ——②

Here, $a_1 \neq a_2$ and $b_1 \neq b_2$ So,

It is consistent and Independent.

b.
$$9x - 2y = -4$$
$$3x + 4y = 1$$

Solution:

Here, $a_1 \neq a_2$ & $b_1 \neq b_2$. So,

It is consistent and independent.

c.
$$-6x + 4y = 10$$
$$3x - 2y = -5$$

Solution:

$$3x - 2y = -5$$
$$3x - 2y = -5$$

Here, $a_1 = a_2$ and $b_1 = b_2$. So,

It's consistent and dependent

d.
$$3x - 4y = 1$$
$$6x - 8y = 7$$

Solution:

$$3x - 4y = 1$$ ——①

$$3x - 4y = \frac{7}{2} \quad \text{———} \textcircled{1}$$

Here, $a_1 = a_2$. So it is inconsistent and independent.

e. $25x - 15y = 45$
$-5x - 3y = 24$

Solution:

Here, $5x - 3y = 9$

$-5x - 3y = 24$

Here, $b_1 = b_2$. So, it's consistent but $c_1 \neq c_2$. So its independent.