Linear Equations in two variables

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This is Problem-2(ii)from Exercise 3.2

1. Which of the following pairs of linear equations are Consistent/Inconsistent?if,consistent find the solutions graphically :

$$9x + 3y = -12 \tag{1}$$
$$18x + 6y = -24 \tag{2}$$
$$\tag{3}$$

Solution:
Equations can also be written as:

$$\begin{pmatrix} 9 & 3 \\ 18 & 6 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -12 \\ -24 \end{pmatrix} \tag{4}$$

$$x = \frac{\begin{vmatrix} \mathbf{b} & \mathbf{a_2} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} -12 & 3 \\ -24 & 6 \end{vmatrix}}{\begin{vmatrix} 9 & 18 \\ 3 & 6 \end{vmatrix}} = \frac{(-12)(6) - (-24)(3)}{(9)(6) - (18)(3)} = \frac{-72 + 72}{54 - 54} = 0 \tag{5}$$

$$y = \frac{\begin{vmatrix} \mathbf{a_1} & \mathbf{b} \end{vmatrix}}{\begin{vmatrix} \mathbf{a_1} & \mathbf{a_2} \end{vmatrix}} = \frac{\begin{vmatrix} 9 & -12 \\ 18 & -24 \end{vmatrix}}{\begin{vmatrix} 0 \end{vmatrix}} = \frac{(9)(-24) - (-12)(18)}{0} = \frac{216 - 216}{0} = 0 \tag{6}$$
$$\tag{7}$$

Therefore, x=y=0;it is a dependent equation