1 Problem Statement

Find the equation of the line parallel to the Y-axis drawn through the point of intersection of the lines

$$(1-7)\vec{x} = -5\, and\, (31)\vec{x} = 0$$

2 Theory

consider the equation of the system of lines

$$x - 7y = -5 \tag{1}$$
$$3x + y = 0 \tag{2}$$

consider the augmented matrix

$$\begin{pmatrix} 1 & -7 & -5 \\ 3 & 1 & 0 \end{pmatrix} \tag{3}$$

By applying row reduction reduction technique
applying row operation :-$R2 \to R2 - 3R1$ we get

$$\begin{pmatrix} 1 & -7 & -5 \\ 0 & 22 & 15 \end{pmatrix} \tag{4}$$

applying row operation :-$R2 \to R2/22$ we get

$$\begin{pmatrix} 1 & -7 & -5 \\ 0 & 1 & \frac{15}{22} \end{pmatrix} \tag{5}$$

applying row operation :-$R1 \to R1 + 7R2$ we get

$$\begin{pmatrix} 1 & 0 & \frac{-5}{22} \\ 0 & 1 & \frac{15}{22} \end{pmatrix} \tag{6}$$

Therefore the value of$x = \dfrac{-5}{22} and\, y = \dfrac{15}{22}$
The required x and y is the point of intersection of lines
Now the equation of line parallel to y-axis through the point of intersection

$$\vec{x} = \begin{pmatrix} 1 & 0 \end{pmatrix} \begin{pmatrix} \frac{-5}{22} \\ \frac{15}{22} \end{pmatrix} \tag{7}$$
$$\vec{x} = \begin{pmatrix} \frac{-5}{22} \end{pmatrix} \tag{8}$$