

a)

$$\begin{bmatrix} 1 & 1 & -2 & 9 \\ 2 & -1 & -1 & 6 \\ -1 & 5 & 1 & 5 \end{bmatrix}$$

R2 - 2R1 and R3 + R1:

$$\begin{bmatrix} 1 & 1 & -2 & 9 \\ 0 & -3 & 3 & -12 \\ 0 & 6 & -1 & 14 \end{bmatrix}$$

3R1 + R2 and R3 + 2R2:

$$\begin{bmatrix} 3 & 0 & -3 & 15 \\ 0 & -3 & 3 & -12 \\ 0 & 0 & 5 & -10 \end{bmatrix}$$

5R1 + 3R3 and 5R2 - 3R2:

$$\begin{bmatrix} 15 & 0 & 0 & 45 \\ 0 & -15 & 0 & -30 \\ 0 & 0 & 5 & -10 \end{bmatrix}$$

So we find the solution:

$$x = 3$$

$$y = 2$$

$$z = -2$$

b)

When  $y = 2$ , we get the following equations:

$$ax + 2 = 4$$

$$-x + 6 = 2$$

From the second equation, we find  $x = 4$

Substituting this in the first equation, we find:

$$2a + 2 = 4 \Rightarrow a = 1$$