For each system of equations, find the solution(s). Also, express each system as an augmented matrix.

I.
$$\begin{aligned} 3x_1 + 5x_2 &= 6 \\ 3x_1 + 6x_2 &= 9 \end{aligned}$$

II.
$$\begin{aligned} 3x_1 + 5x_2 &= 6 \\ 6x_1 + 10x_2 &= 8 \end{aligned}$$

III.
$$\begin{aligned} x_1 - 7x_2 + 6x_4 &= 5 \\ 2x_3 - 4x_4 &= -6 \\ -x_1 + 7x_2 - 4x_3 + 2x_4 &= 7 \end{aligned}$$

1. The echelon form of a system of linear equations in x, y and z is given as

$$\left[\begin{array}{ccc|c} 1 & 2 & -3 & 4 \\ 0 & 0 & h & 3 \end{array}\right]$$

   a. For what values of h is this system ***inconsistent***, if any?

   b. Suppose we choose $h = 1$. Write the solution set.

2. Let $\mathbf{u} = \begin{bmatrix} -1 \\ 3 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$.

   a. Find $4\mathbf{u} - 3\mathbf{v}$

   b. Can you find a and b so that $a\mathbf{u} + b\mathbf{v} = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$?