(1) Find solution of the following system of equations in three variables using row-reduction.

$$\begin{aligned} 2x + 4y + 6z &= 22 \\ 3x + 8y + 5z &= 27 \\ -x + y + 2z &= 2 \end{aligned}$$

(2) Find solution of the following system of equations in three variables using row-reduction.

$$\begin{aligned} x + 2y - 3z &= -2 \\ 3x - y - 2z &= 1 \\ 2x + 3y - 5z &= -3 \end{aligned}$$

(3) Find solution of the following system of equations in three variables using row-reduction.

$$\begin{aligned} x + y + z &= 1 \\ 3x - y - z &= 4 \\ x + 5y + 5z &= -1 \end{aligned}$$

(4) Find solutions of the following system of linear equations in four variables using row-reduction.

$$\begin{aligned} x + 2y - 3z + w &= -2 \\ 3x - y - 2z - 4w &= 1 \\ 2x + 3y - 5z + w &= -3 \end{aligned}$$

(5) * Consider an arbitrary system of linear equations $AX = B$, where A and B are real matrices.
(a) Prove that if the system of equations $AX = B$ has more than one solution then it has infinitely many.
(b) Prove that if there is a solution in the complex numbers then there is also a real solution.