In all homework problems, it is not sufficient to show only the answers. *You must show your work.*

1. Find the solution set of each system.

   (a)
   $$\begin{aligned} x - 2y + z &= 1 \\ 2x + y - z &= 2 \\ 5x - 3y &= 0 \end{aligned}$$

   (b)
   $$\begin{aligned} x + y + 2z &= 0 \\ x - 3y &= 7 \\ 3x + y + 7z &= 0 \\ 2y + z &= -3 \end{aligned}$$

   (c)
   $$\begin{aligned} 2x - y - z + w &= 4 \\ x + y + 2z - w &= -1 \end{aligned}$$

   (d)
   $$\begin{aligned} x + y - 2z &= 0 \\ x - y &= -3 \\ 3x - y - 2z &= 0 \end{aligned}$$

2. For the second system in the first question, give the associated homogeneous system and find its solution set.

3. Solve the linear system via Gauss's method.

   (a)
   $$\begin{aligned} x + y - z &= 3 \\ 2x - y - z &= 1 \\ 3x + y + 2z &= 0 \end{aligned}$$

   (b)
   $$\begin{aligned} x + y + 2z &= 0 \\ 2x - y + z &= 1 \\ 4x + y + 5z &= 1 \end{aligned}$$