(1) [**5 points**] Compute the following matrix product:

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

(2) [**5 points**]

The matrix $\mathbf{A} = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$ has inverse $\mathbf{A^{-1}} = \begin{bmatrix} 1 & -1 & 2 \\ -1 & 2 & -3 \\ -1 & 1 & -1 \end{bmatrix}$.

Use this information to solve the system

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

(3) [**5 points**] Graph the following system of inequalities and determine the corner points:

$$\begin{aligned} 2x + 3y &\leq 12 \\ 3x + y &\leq 12 \\ x &\geq 0 \\ y &\geq 0 \end{aligned}$$