Last name _____

First name _____

LARSON—OPER 731—CLASSROOM WORKSHEET 04
Fourier-Motzkin Elimination

1. Are $\begin{bmatrix}1\\0\end{bmatrix}, \begin{bmatrix}0\\1\end{bmatrix}, \begin{bmatrix}0\\0\end{bmatrix}$ linearly independent?

2. Are $\begin{bmatrix}1\\0\end{bmatrix}, \begin{bmatrix}0\\1\end{bmatrix}, \begin{bmatrix}0\\0\end{bmatrix}$ affinely independent?

3. Are every three vectors in $\mathbb{R}^3$ affinely independent?

4. Find the affine span of $X = \{\begin{bmatrix}1\\0\end{bmatrix}, \begin{bmatrix}0\\1\end{bmatrix}\}$

5. Find the convex hull of $X = \{\begin{bmatrix}1\\0\end{bmatrix}, \begin{bmatrix}0\\1\end{bmatrix}\}$

6. Our text says you need to prove that the convex hull of a finite point set equals the intersection of all convex sets containing those points. What do you need to do?

7. Use Fourier-Motzkin elimination to solve the following LP:

   Maximize:

$$z = x_1 + x_2 + x_3$$

   Subject to:

$$x_1 + x_2 \leq 1$$

$$x_2 + x_3 \leq 1$$

$$x_i \geq 0.$$