Assignment 1 (Due: September 30, Wednesday, in class)

(You don't need to copy questions.)

1. To invest $5400, we have identified four investment opportunities. Investment 1 requires an investment of $500 and has a present value (a time-discounted value) of $800; investment 2 requires $700 and has a present value of $1000; investment 3 requires $400 and has a present value of $600; and investment 4 requires $300 and has a present value of $400. Assume that we need to make at least two investments. If investment 2 is made, investment 4 must also be made. In addition, if investments 1 and 2 are made, investment 3 cannot be made. **Construct the linear system to maximize the total present value** (do not solve it).

2. We have two systems:

   System 1: $x>y, y>z, z>1$
   System 2: $3x-3>3y-3>3z-3$

   Are these two systems equivalent? Provide reason to support your conclusion.

3. Using *Fourier-Motzkin elimination* to solve the following systems:

$$
\begin{aligned}
3x + 4y + 2z &\geq 16 \quad (1)\\
4x + 7y + 2z &\leq 56 \quad (2)\\
-x + 2y + 2z &\leq 5 \quad (3)\\
4x - 7y &\leq 30 \quad (4)\\
2x - 3y &\geq 9 \quad (5)
\end{aligned}
$$

Restrictions: You need to eliminate *x* first, then y.