Homework #10 **Math 527, UNH fall 2015**
Due Tuesday, Nov 24 in recitation.

Problems 1-3: Write the system of equations as an $A\mathbf{x} = \mathbf{b}$ problem, and then find the solution $\mathbf{x}$ by Gaussian elimination.

1. $$\begin{aligned} x + y - 2z &= 14 \\ 2x - y + z &= 0 \\ 6x + 3y + 4z &= 1 \end{aligned}$$

2. $$\begin{aligned} 5x - 2y + 4z &= 10 \\ x + y + z &= 9 \\ 4x - 3y + 3z &= 1 \end{aligned}$$

3. $$\begin{aligned} 5x + 4y - 16z &= -10 \\ y + z &= -5 \\ x - y - 5z &= 7 \end{aligned}$$

Problems 4-6: For the given matrix A, find all solutions $\mathbf{x}$ to the equation $A\mathbf{x} = \mathbf{0}$. First calculate $\det A$. If $\det A = 0$, then there are infinitely many solutions $\mathbf{x}$. If $\det A \neq 0$, then the only solution is $\mathbf{x} = \mathbf{0}$.

4. $A = \begin{pmatrix} 4 & 2 & 3 \\ 2 & 1 & 0 \\ -1 & -2 & 0 \end{pmatrix}$

5. $A = \begin{pmatrix} 2 & 4 & -2 \\ 4 & 2 & -2 \\ 8 & 10 & -6 \end{pmatrix}$

6. $A = \begin{pmatrix} -1 & 3 & 0 \\ 1 & -2 & 1 \\ 0 & 1 & 2 \end{pmatrix}$

Most problems adapted from Appendix II of Zill's "First Course in Differential Equations," 9th edition.