Please write up complete, clear solutions on your own paper. We will be looking for your reasoning and explanations, not just a correct answer. Please copy each question and write neatly.

This assignment covers material in sections 1.4, 1.5 and 1.7. The textbook is a helpful reference for these. You can also get help via email (ewhitaker@uky.edu), via office hours (stop by or make an appointment) or possibly in the Mathskeller (depending on who is tutoring at the time).

For questions 1-4 answer the following, and provide a brief explanation:

(a) Does the equation $A\mathbf{x} = \mathbf{0}$ have nontrivial solutions?
(b) Does the equation $A\mathbf{x} = \mathbf{b}$ have at least one solution for every possible $\mathbf{b}$?

1. A is a 6×6 matrix with six pivot points
2. A is a 6×6 matrix with two pivot points
3. A is a 7×5 matrix with five pivot points
4. A is a 5×7 matrix with five pivot points

5. Describe and compare the solution sets of the equations
   $x_1 + 3x_2 + 5x_3 = 0$ and $x_1 + 3x_2 + 5x_3 = 7$.

6. How many pivot columns must a 5×3 matrix have if its columns are linearly independent? What about a 3×5 matrix? Explain.