Math 4305, Exam 1: 1.1-3.1 (practice)

1. (25 points) (1.2.6) Find the general solution of the system of equations

$$\begin{cases} x_1 - 7x_2 + x_5 = 3\\ x_3 - 2x_5 = 2\\ x_4 + x_5 = 1. \end{cases}$$

Name and section: _____

2. (25 points) (2.3.7) Find the product AB if

$$A = \begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \\ 1 & -1 & -2 \end{pmatrix} \quad \text{and} \quad B = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 2 & 1 & 3 \end{pmatrix}.$$

Name and section:

3. (25 points) (2.4.6) Find the inverse matrix A^{-1} if

$$A = \left(\begin{array}{rrrr} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{array}\right).$$

Name and section:

4. (25 points) (3.1.22) Consider the transformation $T: \mathbb{R}^3 \to \mathbb{R}^3$ given by

$$T(\mathbf{x}) = \begin{pmatrix} 2x_1 + x_2 + 3x_3\\ 3x_1 + 4x_2 + 2x_3\\ 6x_1 + 5x_2 + 7x_3 \end{pmatrix}.$$

What is the image of T?