

**MATH 220
HOMEWORK 1**

Due October 11, 2018, Friday, submit at the beginning of the class

Note: Each solution should start at the top of a page (you can use both sides of the paper) and each sheet should have your name on it. Please don't forget to check your answers by plugging in the solutions you found to the given equations.

1. Solve the following system using Gaussian elimination (by converting the augmented matrix into echelon form).

$$\begin{aligned}2x + 4y - 3z &= 3 \\x + 3y - 5z &= -2 \\3x + 6y - 5z &= 4\end{aligned}$$

2. Consider the matrices

$$A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \\ 1 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & 4 & 2 \\ 3 & 1 & 5 \\ -1 & 0 & 4 \end{bmatrix}, \quad C = \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}.$$

- a) Decide whether or not BC is equal to CB .
 - b) Calculate the matrix $A^T(B + C)$ where A^T is the matrix defined by $(A^T)_{ij} = A_{ji}$ for all i, j .
3. Find an equation of the form $y = ax^2 + bx + c$ whose graph includes the following data points: $(-1, 1)$, $(0, -4)$, $(2, -2)$.
 4. Using the Gauss-Jordan elimination method (convert the associated augmented matrix into reduced row echelon form by using row operations) decide for which values of c the following system is consistent. For those values of c where the system is consistent write all solutions of the system using parameters.

$$\begin{array}{rcccccc}x_1 & +3x_2 & -2x_3 & & +2x_5 & & = & 2 \\2x_1 & +6x_2 & -5x_3 & -2x_4 & +4x_5 & -3x_6 & = & c + 1 \\ & & 5x_3 & +10x_4 & & +15x_6 & = & 5 \\2x_1 & +6x_2 & & +8x_4 & +4x_5 & +18x_6 & = & 8\end{array}$$