

PROBLEM SET 10, 16300 SECTION 21

Due Wednesday June 3

1. Exercise 2.4.28 from Sally's notes
2. Exercise 2.4.29 from Sally's notes.
3. Consider the following system of linear equations: $2x - y + z = 5$, $-x + 3y - 2z = 1$ and $2x + z = 2$. Translate this system of equations into one equation of matrices and vectors, and use the formula in Theorem 2.4.24 in Sally's notes for the inverse of a matrix to solve this equation.

Finally, check that the answer you obtained satisfies the original equations.

4. Let F be a field and consider the vector space $M_2(F)$ of 2×2 matrices with coefficients in F . Fix a matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, and consider the map

$$f_A : M_2(F) \rightarrow M_2(F)$$

given by $f_A(B) = AB$.

Write down a basis for $M_2(F)$ (it should have 4 elements) and use this to represent f_A as a matrix (it should be a 4×4 matrix).