1. For each of the following i) Express the linear system in matrix form, i.e. as . Indicate dimensions of .Determine the solution for  (if any) using Gauss-Jordan Elimination.
   1. 
   2. 
   3. 
2. Bring the following matrix to row echelon form and then to reduced row echelon form by applying elementary row operations



1. Consider . Is this matrix in row echelon form, reduced row echelon form or neither? Explain.
2. If  is 2x3,  is 3x4 and  is 4x2 what are the dimensions (size) of the matrix resulting from

?

1. If  is lower triangular of size nxn what can you say about the matrix product?
2. Perform the matrix product by first expressing the result in terms as of the submatrices.

 .

1. Write down a 4x4 matrix for which the elements satisfy if 
2. Prove that the inverse of matrix  is by solving a set of 4 linear equations in 4 unknowns.
3. Let  Write down a formula for  in terms of .
4. Let a matrix have a column of zeroes. Does its inverse exist? Explain by using .
5. Can you write the following?



What is the correct equality?

1. Find three row operations that will turn  into .Write down the elementary matrices for each.
2. Is it possible to apply elementary row operations to turn an invertible matrix into a matrix with an all zeroes column?
3. Try to find the inverse of the following matrices by Gauss Jordan elimination on augmented matrices of the form 

a) b) c) 

1. State the elementary row operations needed to turn  into . (Hint: For each determine the sequence of elementary row operations to get the identity matrix)
2. LU decomposition: Prove that an invertible matrix can be expressed as  where  is lower triangular and  is upper triangular. (Hint: Product of lower triangular elementary matrices is lower triangular. What about the row echelon form?)
3. Determine the inverse of the diagonal matrix .
4. Is the given triangular matrix invertible? Explain by saying what happens when the matrix is reduced to a row echelon or reduced row echelon form. Do you get a row of zeroes or not? (Do not try to compute the inverse.)

