**Solutions of Linear Systems** (from 1.3)

Notation: A system of linear equations can be represented as the augmented matrix: 

Ex 1:  with the corresponding augmented matrix 

After Gauss-Jordan (Gaussian) Elimination, we find 

This means 

Notation: In this class we will quickly run out of letters. Rather than writing , we will use the vector

notation  where the index *i* in  indicates the row. In Ex 1: 

Ex 2: Find the solution(s) to the system with augmented matrix 

After Gauss-Jordan (Gaussian) Elimination, we find 

This means

Ex 3: After Gauss-Jordan (Gaussian) Elimination, we find that for a given system of linear equations, the

row reduced augmented matrix is 

This means

Ex 4: After Gauss-Jordan (Gaussian) Elimination, we find that for a given linear system, the row reduced

augmented matrix is 

This means

Summary: Systems of linear equations with corresponding augmented matrices  fall into the

following categories with corresponding easily identified characteristics of 

* Inconsistent systems
  + “No solution” and contain the row in  of the form 
* Consistent systems
  + A unique solution, all columns of  contain a leading one (pivot)
  + Infinite solutions, at least one column of  does not contain a leading one (pivot)