

Activity 5: Inverses of Matrices, Vector Spaces

Names: _____ Date: October 15, 2009 Score: _____

Show your work for each of the following. You should submit one copy for your group. Feel free to ask your instructor for advice if you need it.

1. (5 pts) Find the inverse of the matrix $M = \begin{bmatrix} 4 & 1 & 2 \\ 1 & 1 & 0 \\ 6 & 0 & 2 \end{bmatrix}$ using elementary row operations.

2. (5 pts) Find the inverse of the matrix $M = \begin{bmatrix} 4 & 1 & 2 \\ 1 & 1 & 0 \\ 6 & 0 & 2 \end{bmatrix}$ using a formula with determinants.

3. (1 pt each) Give an example for each of the following.

- An non-invertible two by two matrix.
- An invertible three by three matrix.
- Three linearly independent vectors in \mathbb{R}^3 .
- Two linearly dependent vectors in \mathbb{R}^3 .
- Three linearly dependent vectors in \mathbb{R}^3 .
- A basis of \mathbb{R}^3 .
- A different basis of \mathbb{R}^3 .
- A nontrivial subspace of \mathbb{R}^3 , i.e. one that is not $\{\mathbf{0}\}$ or \mathbb{R}^3 .
- Two vectors in \mathbb{R}^3 whose span is a plane.
- Two vectors in \mathbb{R}^3 whose span is a line.
- A line in \mathbb{R}^3 which is is not a subspace of \mathbb{R}^3 .