MATH 54 – HINTS TO HOMEWORK 6

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Here are a couple of hints to Homework 6. Enjoy!

SECTION 2.3: CHARACTERIZATIONS OF INVERTIBLE MATRICES

For the first few problems, row-reduction is the key!

2.3.11. Just look at theorem 8. If one of those statements holds, then all of them hold!

2.3.13. Only if all the entries on the diagonal are nonzero! See theorem $8(c)$

2.3.14. No! See theorem $8(h)$

2.3.19. It has at least one solution for every (in fact, exactly one solution), see Theorem $8(g)$.

2.3.30. It is invertible by theorem $8(f)$ and hence also onto by theorem $8(i)$. This is one of the special features of $\mathbb{R}^n$ and about linear transformations! You cannot expect this result to be true in general!

SECTION 2.6: SUBSPACES OF $\mathbb{R}^n$

2.6.3. Not closed under addition

2.6.5. One way to do this is to group the vectors $\mathbf{v_1}$ and $\mathbf{v_2}$ together in a matrix A, and solve $A\mathbf{x} = \mathbf{w}$.

2.6.7.

(a) 3
(b) Infinitely many of them! (but in a sense, you'll see that $Col(A)$ is a 2 or 3 dimensional space).
(c) Solve $A\mathbf{x} = \mathbf{p}$

2.6.9. Just check whether $A\mathbf{p} = \mathbf{0}$ or not.

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2.6.21. All statements are **True**, **EXCEPT** (c) (should be $\mathbb{R}^n$)! Notice that in particular (a) is true! The book is just being picky about this, even though it omitted the word 'for each', the statement still remains true (the words 'for each' here are implied)

2.6.23. To find $Nul(A)$, solve $A\mathbf{x} = \mathbf{0}$ using the row-echelon form. To find $Col(A)$, notice that the first two columns of A are pivot columns. In particular, a basis for $Col(A)$ is the set of the first two columns of the *original* matrix A.