

MATH 54 – HINTS TO HOMEWORK 7

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Here are a couple of hints to Homework 7. Enjoy!

SECTION 2.7: DIMENSION AND RANK

2.7.3, 2.7.5. Find the coefficients of \mathbf{x} as a linear combination of \mathbf{b}_1 and \mathbf{b}_2 .

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

2.7.16, 2.7.21. Use the fact that $\dim(Nul(A)) + \text{rank}(A) = n$

2.7.23. For example:

$$A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

2.7.24. For example:

$$A = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

SECTION 3.1: INTRODUCTION TO DETERMINANTS

Always try to look for a row/column full of zeros! May Bomberman be with you :)

3.1.19, 3.1.21. What you're asked to do is: compute the determinants of the first matrix and of the second matrix and compare them. Also, explain how to obtain the second matrix from the first using a row-operation!

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3.1.41. The area of the parallelogram always equals to the determinant of $[\mathbf{u} \ \mathbf{v}]$. Use the formula: Area of parallelogram = base \times height. The two areas should be the same (by the way, this fact is a very simplified version of Cavalieri's principle)