

## MATH 54 – HINTS TO HOMEWORK 2

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Here are a couple of hints to Homework 2. Enjoy! :)

### SECTION 1.3: VECTOR EQUATIONS

**1.3.7.** Here's a cool trick! **Any** vector in  $\mathbb{R}^2$  is a linear combination of two linearly independent vectors! So the answer is immediately

**1.3.11, 1.3.15.** Determine if/when the equation  $Ax = b$  has a solution or not (where  $A$  is the matrix whose columns are the  $a_i$ )

**1.3.22.** All you have to find is an inconsistent system! For example:

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}, \text{ and } \mathbf{b} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

**1.3.25. Careful!** A set is not the same as the span of a set. In particular,  $\mathbf{b}$  is not in  $\{a_1, a_2, a_3\}$  because it is not equal to either of those vectors. However, it might be in the span of those 3 vectors! Also, for (c), remember that  $a_1$  is always in the span of  $\{a_1, a_2, a_3\}$ .

### SECTION 1.4: THE MATRIX EQUATION $Ax = b$

**1.4.17, 1.4.18.** Row-reduce! Also, use Theorem 4(d) on page 45.

**1.4.29.** The easiest way to do this is find a matrix in row-echelon form that has this property, and then just interchange two rows! For example, the following matrix works:

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