**Office Hour Help:** M & W 2:30–4:00, Tu 2:00–3:30, & F 1:30–2:30 or by appointment. Website: `http://math.hws.edu/~mitchell/Math204S16/index.php`.

## ☕ *Reading, Practice, and Review*

**1.** Read ahead in Section 1.4 and review Section 1.3.

(*a*) You should be able to define these key concepts: **column vector, scalar multiple, zero vector, linear combination** and $\mathbb{R}^n$.

(*b*) How can you tell from the (reduced) row-echelon form of a system whether it has no, exactly one, or infinitely many solutions?

**2.** (*a*) Practice (not collected). Do Practice Problem #1 on page 31. The answer is on page 34 but it should use column vectors.

(*b*) Page 32 #1, 3, 5, 7, 9, and 11.

## *Hand in: Due Monday*

Remember due Friday: WeBWorK set `HW1` on linear systems.

**1.** Section 1.2, Exercises 17 and 18. Be sure to show your work and justify your answers.

**2.** Section 1.2, Exercise 20. Be sure to show your work/reasoning. Review the answers to the a similar, easier question on the Day 2 Assignment.

Hint: Which Theorem is helpful?

**3.** Section 1.2, Exercise 24. Be sure to justify your answer.

**4.** For each of the following, decide whether or not it is possible for a system to satisfy the given description. If it is possible, give an augmented matrix (in row-echelon or reduced row-echelon form) that corresponds to such a system and prove that the corresponding system does in fact fulfill the requirements; if it is not possible, prove that it is not possible.

Hint: Which Theorem is helpful.

(*a*) A system of 5 equations in 3 unknowns that has exactly 1 solution.

(*b*) A system of 5 equations in 3 unknowns that has infinitely many solutions.

(*c*) A system of 5 equations in 3 unknowns that has exactly 2 solutions.

**5.** Repeat Problem 3 for the following statements.

(*a*) A system of 3 equations in 5 unknowns that has infinitely many solutions.

(*b*) A system of 3 equations in 5 unknowns that has no solutions.

(*c*) A system of 3 equations in 5 unknowns that has exactly 1 solution.

**6.** Section **1.3**, Exercise 10. Easy, but important in the next section!

**7.** Section **1.3**, Exercise 12.

**8.** I will add one or two problems on Friday to this assignment.

*Classwork*

**EXAMPLE:** Let $\mathbf{v}_1 = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$ and $\mathbf{v}_2 = \begin{bmatrix} -2 \\ 2 \end{bmatrix}$. Express each of the following as a linear combination of $\mathbf{v}_1$ and $\mathbf{v}_2$:

$$\mathbf{a} = \begin{bmatrix} 0 \\ 3 \end{bmatrix}, \quad \mathbf{b} = \begin{bmatrix} -4 \\ 1 \end{bmatrix}, \quad \mathbf{c} = \begin{bmatrix} 6 \\ 6 \end{bmatrix}, \quad \mathbf{d} = \begin{bmatrix} 7 \\ -4 \end{bmatrix}$$