

MATH 341 SECTION
WRITTEN HOMEWORK 3
DUE OCTOBER 21, 2015.
INSTRUCTOR: ROBERT LIPSHITZ

Required textbook problems (hand these in):

- §1.7: 6, 9, 12, 15, 16, 17, 18, 19, 20, 24, 27, 28, 33, 34
Note: in 15–20, “by inspection” means “just by staring at them, without doing any computation”. (i.e., by pure thought.) *Do* write a brief (one sentence) justification of why the vectors are or aren’t linearly independent.
- §1.8: 1, 4, 10, 12, 13, 14, 15, 16, 29, 32, 33
Note: Most of these very quick if you understand what’s going on. In 32 and 33, “show that” means find one of the properties (i), (ii) that is violated by T , with *specific* $\vec{u}$, $\vec{v}$, and/or c .
- §1.9: 1, 2, 3, 4, 5, 6, 10, 11, 17, 25, 26, 29

Suggested practice (don’t hand these in):

- Please read and make sure you can do the practice problems in sections 1.8, 1.9, 1.10.
- Please read and use for review problems 1.7.21, 1.7.22, 1.7.29, 1.7.30, 1.7.31, 1.7.32, 1.8.7, 1.8.8, 1.8.21, 1.8.22, 1.9.19, 1.9.23, 1.9.24, 1.9.31, 1.9.32, 1.9.35
- If you had trouble or got help with any of the assigned problems, solve another, similar problem (or two).

Bonus points. As usual, bonus points for learning Sage.

- (1) Follow the steps in the post “Creating convenient matrices”.
- (2) Create a length 142 vector whose entries alternate 1,2,1,2,... Do *not* do this by typing 1,2 71 times: use operations on lists as explained in the post. Call your vector “v”.
- (3) Use Sage to verify that if Z is the 3×142 zero matrix then Zv is the length 3 zero vector.
- (4) Use Sage to verify that if I is the 142×142 identity matrix then $Iv = v$. (In a correct solution, your worksheet should output “True” at a certain point.)
- (5) Extra optional: write a Sage function which takes as input a slope m and returns the 2×2 matrix representing reflection across the line $y = mx$. (Hint: first figure out by hand what the matrix should be...)

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