

MATH 341
WRITTEN HOMEWORK 5
DUE FEBRUARY 12, 2020.
INSTRUCTOR: ROBERT LIPSHITZ

Required textbook problems (hand these in):

- (1) §2.1: 27.
- (2) §2.2: 2, 7, 13, 14, 15, 18, 30, 31, 32, 33.
- (3) Write $\begin{bmatrix} 5 & 10 \\ 4 & 7 \end{bmatrix}$ and $\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$ as products of elementary matrices.
- (4) §2.3: 3, 4, 15, 16, 17, 18, 19, 26, 34, 36, 38.
- (5) §2.4: 1, 2.
- (6) §2.5: 1, 2, 8, 9, 10.

Suggested practice (don't hand these in):

- Please read and make sure you can do the practice problems in section 2.2, 2.3, 2.4, 2.5.
- Please read and use for review problems 2.2.9, 2.2.10, 2.3.11–2.3.14, 2.4.11, and 2.4.12.
- 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 “Matrix algebra 2”.
- (2) Use Sage to check your answer to problem (3) above.
- (3) Use Sage to solve problem 2.5.31.
- (4) Use Sage to create a random 15×15 sparse matrix A , with the command:

`A = random_matrix(ZZ, 15, density=0.35)`

(You can adjust what fraction of the entries are non-zero by adjusting the density setting.) Have Sage compute the LU factorization of A and the inverse of A . (You might need to try a few times or turn up the density setting slightly to get an invertible matrix.)

Email address: `lipshitz@uoregon.edu`