

**Due:** upload to Gradescope by Friday 8 November 2019 at 3pm.

**Reading:** Chapter 3.4 and 5.1 from the textbook.

Grading: 1 point per exercise for completeness. The exercises marked with a  $(\star)$  will also be graded for correctness, and will be assigned an additional 3 points each.

Submit written solutions to the following exercises:

**Q1**( $\star$ ): Show that the zero vector in  $\mathbb{R}^n$  is linearly dependent. (Hint: use the characterization of linear independence in terms of the non-existence of non-trivial relations: vectors  $v_1, \dots, v_m$  in  $\mathbb{R}^n$  are linearly independent if and only if the only relation between them is the trivial relation (i.e., the only solution to the equation  $c_1v_1 + \dots + c_mv_m = 0$  is  $c_1 = \dots = c_m = 0$ ).)

**Q2:** Give an example of a matrix  $A$  for which  $\text{im}(A) \neq \text{im}(\text{RREF}(A))$ .

Submit your written solutions to the following questions from the textbook:

**Chapter 3.4:**

Ex. 22

Ex. 27( $\star$ )

Ex. 32

Ex. 37( $\star$ )

Ex. 50

Ex. 61

**Chapter 5.1:**

Ex. 1

Ex. 4

Ex. 10

Ex. 16

Ex. 17( $\star$ )

Ex. 28( $\star$ )