

## Homework 1, due Friday 9/3

1. p. 3, problem 4
2. p. 7, problems 3 (a), 7 (a), 11 (a)
3. Evaluate the following.
  - (a)  $\begin{pmatrix} 0 & 1 & -1 \\ 2 & 3 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ e \end{pmatrix}$
  - (b)  $\begin{pmatrix} 1 & 2 \\ 2 & 1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 1 \end{pmatrix}$
4. p. 16, problem 2 (a), (b), (d)
5. (a) Let  $A, B$  be square matrices of the same size. Show that  $(A+B)^2 = A^2 + AB + BA + B^2$ .  
(b) Give examples of  $2 \times 2$ -matrices  $A$  and  $B$  such that  $(A+B)^2 \neq A^2 + 2AB + B^2$ .
6. Let  $A = \begin{pmatrix} 1 & 2 \\ 0 & 2 \end{pmatrix}, B = \begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix}$ . Show that  $(AB)^2 \neq A^2B^2$ .
7. Let  $A = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ . Compute  $A^2$  and compare with  $-I_2$ .
8. p. 29, problems 4, 9 (b), 10 (a)
9. Let  $A$  be a non-singular matrix, show that  $A^{-1}$  is non-singular and that  $(A^{-1})^{-1} = A$ .
10. p. 30, problems 11, 20