Homework 5
due Mon, April 24

1. (3pts) p. 233 #4.2.
2. (4pts) p. 240 #5.6.
3. (4pts) p. 241 #5.10.
4. (a) (2 pts) Show that the Frobenius norm $\|A\|_F = \sqrt{\sum_{ij} |A_{ij}|^2}$ of an $n \times n$ matrix A satisfies

$$\|Ax\|_2 \leq \|A\|_F \|x\|_2, \qquad (x \in \mathbb{R}^n)$$

   hence $\|A\|_2 \leq \|A\|_F$. Give a simple example where $\|A\|_2 < \|A\|_F$.

   (b) (3pts) Show that

$$\|A\|_1 = \max_j \sum_{i=1}^{n} |A_{ij}| \quad \text{and} \quad \|A\|_\infty = \max_i \sum_{j=1}^{n} |A_{ij}|$$

5. (2pts) p. 340 #4.1.
6. (2pts) p. 340 #4.6.