Math 3620 Homework Problems 2: Due Thur., Jan. 23, 2020

1. Show that if an $n \times n$ matrix A is positive definite, then it is nonsingular.

2. Show that $\|x\|_\infty \le \|x\|_2 \le \|x\|_1$ for all $x \in \mathbb{R}^n$.

3. Show that $\|x\|_1 \le n\|x\|_\infty$ and $\|x\|_2 \le \sqrt{n}\|x\|_\infty$ for all $x \in \mathbb{R}^n$.

4. Show that the condition number of an invertible matrix must be at least 1.

5. Show that if A and B are two $n \times n$ matrices, then $\kappa(A) \le \kappa(A)\kappa(B)$.

6. Show that $\kappa(\lambda A) = \kappa(A)$ for all nonzero κ.