# Homework #5

**Due In Class:** Thursday, October 2.

**Reading:** Finish reading Chapter 3 in the textbook before the midterm on October 7.

Turn in the following problems. Exercise a.b refers to Exercise b in Chapter a of the textbook.

**Problem A:** Exercise 3.3

**Problem B:** Exercise 3.23

**Problem C:** Exercise 3.24(b,c) *(You may assume 3.24(a) without proof.)*

**Problem D:** Exercise 3.24(d,e) *(You may assume 3.24(a,b,c) without proof.)*

**Problem E:** Let $X$ be the metric space of nonempty compact subsets of $\mathbb{R}^2$ equipped with the Hausdorff distance (as defined on previous homework assignments). Given any $K \in X$, let $X_K$ denote the subset of $X$ consisting of all nonempty compact subsets of $K$ (including $K$). Prove that for all points $K \in X$, the set $X_K$ is totally bounded in $X$, i.e. for all $\varepsilon > 0$, $X_K$ can be covered by finitely many balls $B(K_1, \varepsilon), \ldots, B(K_n, \varepsilon)$ in $X$.