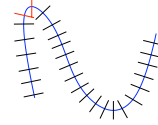


M421 HW 3



Due Friday Oct. 14

From Wade

Section	Page Number	Problems
8.3	296	7, 9
8.4	302	7, 9, 10a
9.2	311	3, 6, 8

Non-book Exercises

1) Define the distance between two non-empty sets $A, B \subset \mathbf{R}^n$ as

$$d(A, B) := \inf\{\|\vec{x} - \vec{y}\| : \vec{x} \in A, \vec{y} \in B\}.$$

(a) Show that if A is compact and B is closed, then $d(A, B) > 0$.

(b) Give an example of $A, B \subset \mathbf{R}^2$ both closed for which $A \cap B = \emptyset$ but $d(A, B) = 0$.

2) **Honors Problem:** Determine if $\forall E \subset \mathbf{R}^n$ the complement of the interior of the complement of E is the closure of E , that is

$$((E^c)^\circ)^c = \overline{E}.$$

If true, prove it. If false, provide a counter-example.