

Math 3371

Homework #6

3.2.2 &, 3.2.8 ab,

3.3.2 abc, 3.3.5 cd

3.2.2 & $\bar{A} = A \cup \{-1, 1\}$

$$\bar{B} = [0, 1]$$

3.2.8a $\overline{A \cup B}$ is closed, since it's the closure of something.

b $A - B = A \cap B^c$ is open, since
 A & B^c are both open.

3.3.2a \mathbb{N} is not compact: $(1, 2, 3, \dots)$ has no conv. subseq.

b $\mathbb{Q} \cap [0, 1]$ is not compact:
We can choose a sequence of rationals approaching
an irrational in $(0, 1)$.

c it is compact. (Closed & bounded)

3.3.5c False: $K = [0, 1]$ is compact, but
let $A = (0, 1/2)$, then
 $A \cap K = (0, 1/2)$ is not compact.

d False: let $F_i = [i, \infty)$.

Then F_i are closed, but

$$\bigcap_{i=1}^{\infty} F_i = \emptyset$$