HOMEWORK 4

(1) Let Y be a subspace of X. If Y is closed in X and A is closed in Y, then show that A is closed in X.

(2) Show that

$$X \setminus \text{Cl } A = \text{Int } (X \setminus A).$$
$$X \setminus \text{Int } A = \text{Cl } (X \setminus A).$$

(3) Show that $\mathbb{Q}$ has empty interior in $\mathbb{R}$ but its closure is whole of $\mathbb{R}$.

(4) Show using the topology given by the basis $B_{d,r}$ on $\mathbb{Z}$ that there are infinitely many prime numbers.

(5) Show that $\mathbb{R}_\ell$ is separable, and any subspace of $\mathbb{R}_\ell$ is also separable.

(6) Topology (Munkres), Chapter 2, Section 17, Exercise (16)(a).

(7) Topology (Munkres), Chapter 2, Section 17, Exercise (19).

(8) Topology (Munkres), Chapter 2, Section 17, Exercise (20).

(9) Topology (Munkres), Chapter 2, Section 17, Exercise (21).