

**Problem 1** (10 Points) State and prove Jordan's theorem.

**Problem 2** (10 Points) Prove that if  $f$  is integrable over the closed and bounded interval  $[a, b]$ , then

$$\frac{d}{dx} \left[ \int_a^x f \right] = f(x) \forall x \in (a, b)$$

**Problem 3** (5 Points) Prove that the Cantor-Lebesgue function is not absolutely continuous.