Math 3A03 - Tutorial 6 Questions - Winter 2019

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Problem 1. *(a) Find the closure, interior points, accumulation points, and boundary points of the set* $S = [0, \sqrt{5}] \cap \mathbb{Q}$*. Is this set open? Is it closed?*

(b) Show that $O = (0, 3)$ *is open.*

(c) Show that $C = [0, 3]$ *is closed.*

Problem 2. *Show that* $S = [0, 1] \cap \mathbb{Q}$ *is not compact by verifying explicitly that the Heine-Borel property does not hold. Hint: How was this approached in class for* $(0, 1]$*? How can that proof be modified?*

Problem 3. *Suppose that* K *is a compact set, and* $D \subseteq K$ *is a closed subset. Prove that* D *is also compact by verifying that it has the Heine-Borel property.*