Math 301 — Limit points, isolated points, closed sets

Problem 1. Consider the set $\{1\}$. What are its limit points? Is it a closed set? Does it have isolated points?

Problem 2. Consider the set $A = \{1/n : n \in \mathbb{N}\}$. Explain why 0 is a limit point of A. Is A a closed set? Explain why every element of A is an isolated point.

Problem 3. Consider the set $\mathbb{Q}$. Explain why $\mathbb{Q}$ has no isolated points and explain why $\mathbb{R}$ is its set of limit points. Is $\mathbb{Q}$ a closed set?

Problem 4. Is $\emptyset$ a closed set? Why or why not?