Name: _____ Score (Out of 10 points):

1. (10 points) Below are two metric spaces X and subsets A. For each subset, state the interior, closure, and boundary of A, and its set A' of accumulation points. **No justification needed.**

   $X = \mathbb{R}$ with the Euclidean metric, A any nonempty **finite** subset.

   $\text{Int}(A) =$ $\varnothing$ $\quad \overline{A} =$ A $\quad \partial A =$ A $\quad A' =$ $\varnothing$

   $X = \mathbb{R}$ with the Euclidean metric, A is the subset of **irrational** real numbers.

   $\text{Int}(A) =$ $\varnothing$ $\quad \overline{A} =$ $\mathbb{R}$ $\quad \partial A =$ $\mathbb{R}$ $\quad A' =$ $\mathbb{R}$

   $X = \mathbb{R}$ with the Euclidean metric, $A = \left\{ \left(\frac{-1}{2}\right)^n \mid n \in \mathbb{N} \right\}$.

   $\text{Int}(A) =$ $\varnothing$ $\quad \overline{A} =$ $A \cup \{0\}$ $\quad \partial A =$ $A \cup \{0\}$ $\quad A' =$ $\{0\}$

   X is the open interval $(0, 2)$ with the Euclidean metric, $A = \left\{ \frac{1}{n} \mid n \in \mathbb{N} \right\}$.

   $\text{Int}(A) =$ $\varnothing$ $\quad \overline{A} =$ A $\quad \partial A =$ A $\quad A' =$ $\varnothing$

   $X = \mathbb{R}$ with the **discrete** metric, $A = (0, 1)$.

   $\text{Int}(A) =$ A $\quad \overline{A} =$ A $\quad \partial A =$ $\varnothing$ $\quad A' =$ $\varnothing$