Quiz 2

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [4] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true and briefly justify your answer. Otherwise, circle F and provide a counterexample or brief reasoning.

   T   F $\{2, 8\} \in \{-3, 2, 0, 8.3\}$

   T   F $24.3 \in \{x \in \mathbb{R} \mid 1 \leq 2x < 58\}$

2. [6] (Suggested §2.1 #25) Let A and B be sets.
   Prove that $\mathcal{P}(A) \subseteq \mathcal{P}(B)$ if and only if $A \subseteq B$.

3. [3] (HW3 §2.2 #1) If A and B are sets such that $A \backslash B = \{3, -27\}$, $B \backslash A = \{15, 4, 13, 9\}$, and $A \cap B = \{8, 10, 3.8\}$, find the sets A and B.

4. (Suggested §2.2 #29) What can you say about the sets A and B if we know that:

   (a) [2] $A \cup B = A$? Justify your answer.

   (b) [3] $A \setminus B = B \setminus A$? Justify your answer.

5. (set wks #7) Let the venn diagram be of the sets S and T below in the universal set U. The set S is the one on the left and the set T is the one on the right.

   (a) [1] Identify (by shading) the set $\overline{S \cap T}$.
   (b) [1] Use Set Identities (such as distributive or deMorgan's laws) to write the set in part (a) in a different manner.