$|\{1,2,2\}| = |\{2,1\}| = 2$

CS1231 Review 6

1. Determine whether the following are true or false.

   - $\{1,2,2\} = \{2,1\}$. T
   - $\mathbb{Q}$ has infinitely many elements. T
   - $0 \notin \mathbb{Q}$. F ($0 \in \mathbb{Q}$)
   - $\{\mathbb{Q}\}$ has infinitely many elements. F ($\mathbb{Q}$ is the only element in $\{\mathbb{Q}\}$)
   - $0 \in \{\mathbb{Q}\}$. F
   - $\mathbb{Q} \in \{\mathbb{Q}\}$. T
   - $\mathbb{Z} \in \{\mathbb{Q}\}$. F

2. $A = B$ iff $\forall x$ $(x \in A \Leftrightarrow x \in B)$ iff $A \subseteq B$ and $B \subseteq A$

3. $A \subseteq B$ iff $\forall x$ $(x \in A \rightarrow x \in B)$

4. $A \subset B$ iff $\forall x$ $(x \in A \rightarrow x \in B)$ and $A \neq B$
   (means $A \subseteq B$)

5. Determine whether the arguments are ~~true~~ valid

   Valid.

   - Premises: If Socrates is human, then Socrates is mortal. ($P \rightarrow Q$)
     Socrates is human. (P)
     Conclusion: $\therefore$ Socrates is mortal. ($\therefore Q$)
   - Premises: If George does not have eight legs, then he is not an insect. ($\neg P \rightarrow \neg Q$)
     George is an insect. (Q)
     Conclusion: $\therefore$ George has eight legs. ($\therefore P$)