Class Work: Proving Set Relationships
This is a full-time activity worth 10 points.

Problems of the Day

Give complete proofs for ALL of the statements below. Some of these are very short. You will submit this proof in a formal writeup at the end of the class. For all of these statements, A and B are sets that are subsets of some universal set U.

1. Prove BOTH of the following. They should be very short.
   (a) Prove $A \cap B \subseteq A$.
   (b) Prove $A \subseteq A \cup B$.
2. Prove ONE of the following. These are not as short.
   (a) Prove that if $A \subseteq B$, then $A \cap C \subseteq B \cap C$.
   (b) Prove that if $A \subseteq B$, then $A \cup C \subseteq B \cup C$.
3. Prove ONE of the following.
   (a) Prove that the sets $A \cap B$ and $A - B$ are disjoint.
   (b) Prove that $A - B = A \cap B^c$.

Parameters

If your group finishes the proof you're assigned, please hand it in at the end of class. If all groups finish by the end of class, we will take time to debrief the solutions to one or more of these.