

Math175 - Discrete Mathematics - Spring 2005

Quiz #6, April 27, 2005

In the following problems you are required to show all your work and provide the necessary explanations everywhere to get full credit.

1. The following is a proof that for any sets A and B ,

$$B - A = B \cap A^c.$$

Fill in the blanks.

Proof: Suppose ___ and ___ are any sets.

Step 1. We first prove that $B - A \subseteq$ _____.

Suppose $x \in$ _____. From this by definition of set difference it follows that $x \in$ ___ and $x \notin$ _____. But then by definition of complement $x \in$ ___ and $x \in$ _____, and so by definition of _____ we have $x \in B \cap A^c$.

Step 2. We now prove that _____.

Suppose $x \in$ _____. From this by definition of _____ it follows that $x \in$ ___ and $x \in$ _____. But then by definition of complement $x \in$ ___ and $x \notin$ _____, and so by definition of set difference we have _____. ■

2. Derive the following set property from those given in the Theorem About Set Identities and Theorem About Set Properties That Involve \emptyset :

For all sets A and B we have $(B \cap A) \cup (A - B) = A$.